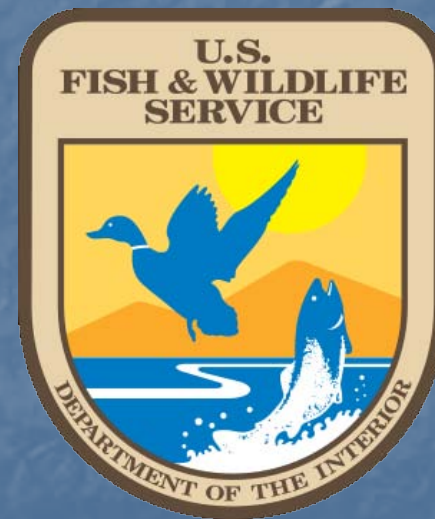


# HACCP

Hazard Analysis and Critical Control Point

Planning to Prevent the  
Spread of Invasive Species



# Define Terminology

**Native / Indigenous**

**vs.**

**Invasive (aka...)**

- Nuisance species
- Introduced or Alien / Foreign

Non-native / Non-indigenous / Exotic

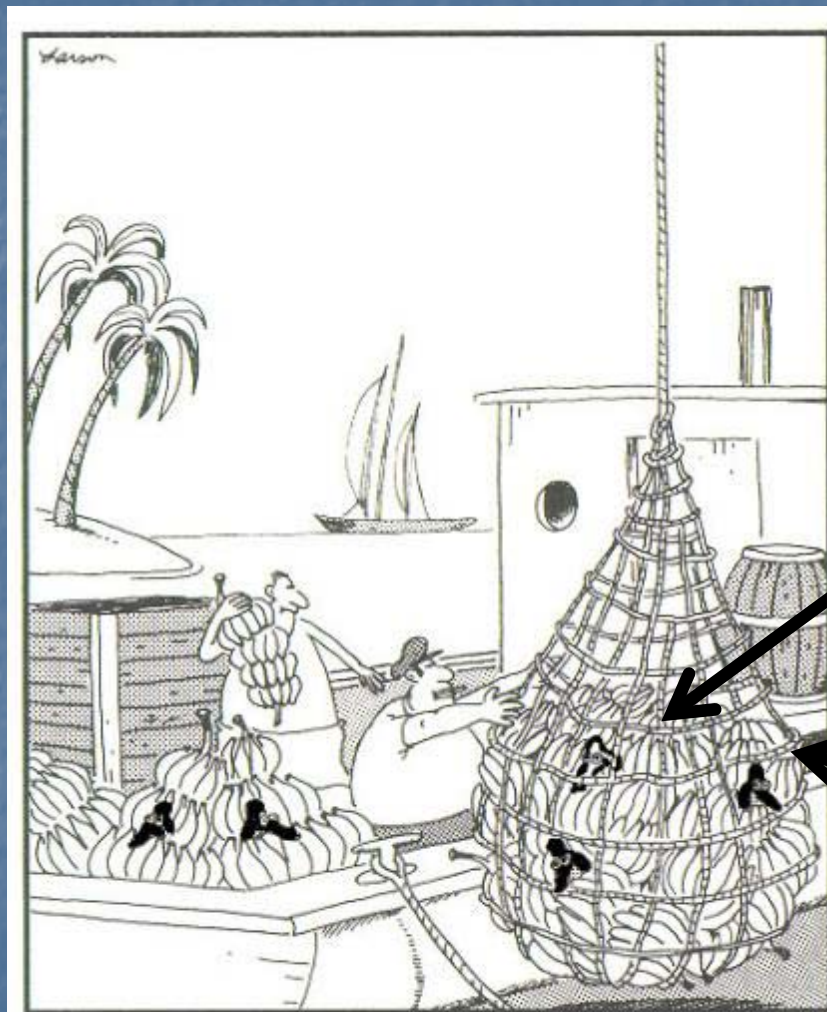
- Established / Naturalized

**HACCP definitions:**

- Target Species
- Non-target species (NTS)



# Target versus Non-target



Target

Non-target

How Poodles Came to America

# The problem with non-native invasive species...

## Severe, Irreversible Environmental Impacts

- 2nd leading cause of native species' Global biodiversity loss

## Costly Economic Impacts

- Worldwide Cost = \$1.4 trillion
- U.S. = \$138 billion (International Congress on Bioinvasions 2009)

## Cultural

## Risk to Human Health



# Impacts: Ecological

## Brown Tree Snake (*Boiga irregularis*)



### WHAT TO DO IF YOU SEE A SNAKE

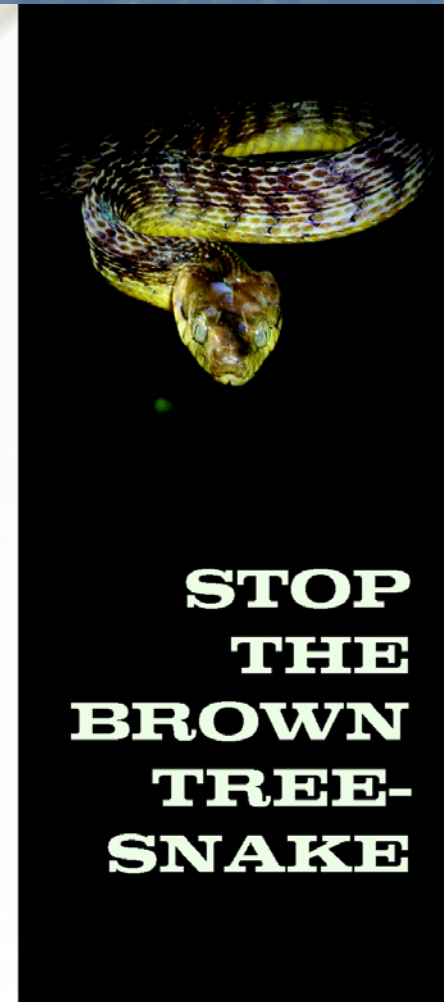
1. Call the Pest Hotline immediately: 643-PEST. Monitor the snake until trained authorities arrive. If the snake is resting or hiding in an enclosed area, do not disturb it.
2. If it is moving and you are unable to contain it, track its location until authorities arrive.
3. If the snake attempts to flee, and it is safe to do so, kill it by striking the back of its head with a heavy object, or cut it in half with a machete or other implement.
4. If the snake is dead, put it in a plastic bag labeled with the location, date and time of capture. Store it in the freezer for pick up and examination by authorities.
5. If you have a pet snake, voluntarily turn it in by calling 643-PEST which offers immunity from prosecution.
6. Being caught with a snake could mean a fine of up to \$200,000 and three years in jail. Anyone with information or knowledge of snakes or other illegal animals should call 643-PEST (643-7378).



REPORT ALL SNAKE SIGHTINGS  
TO

**643-PEST (643-7378)**  
Dial direct from any island

HAWAII DEPARTMENT OF AGRICULTURE



**STOP  
THE  
BROWN  
TREE-  
SNAKE**

# Impacts: Ecological Kudzu

- Crowds out native species
- 1876 Centennial Exposition in Philadelphia
- Originally a erosion control and garden plant
- Kudzu Clubs honoring miracle vine
- Declared a weed in 1972
- Noxious Weed in 1997
- 7 million acres
- Grows 1 foot per day



# Impacts: Economic Emerald Ash Borer



DGA12 41011

## DON'T MOVE FIREWOOD

Our forests are threatened by nonnative insects that can kill large numbers of trees. Three recently introduced insects—emerald ash borer, Asian longhorned beetle, and Sirex woodwasp—are wood-infesting species that can be transported long distances in firewood. Once transported into new areas, these insects can become established and kill local trees. We must **STOP THE SPREAD** of these insects and protect our forests and trees.

### How you can help:

- Leave firewood at home—do not transport it to campgrounds or parks.
- Use firewood from local sources.
- If you have moved firewood, burn all of it before leaving your campsite.



Inset photo: Asian longhorned beetle larva (courtesy of Thomas B. Denholm, New Jersey Dept. of Agriculture, [www.forestryinajags.org](http://www.forestryinajags.org))

## HELP STOP INVASIVE PESTS

For more information, visit the following Web sites:  
[www.emeraldashborer.info](http://www.emeraldashborer.info)  
[www.na.fs.fed.us/ftp](http://www.na.fs.fed.us/ftp)  
[www.aphis.usda.gov/ppq/ep](http://www.aphis.usda.gov/ppq/ep)



USDA Forest Service  
Northeastern Area  
State and Private Forestry  
NA-PR-02-06  
April 2006  
[www.na.fs.fed.us](http://www.na.fs.fed.us)

The USDA is an equal opportunity provider and employer.

# Impacts: Economic Quagga and Zebra Mussels

- Clog water intakes and pipes
- Damage pump
- Decrease power production
- Increase maintenance costs
- Harm commercial fisheries
- Damage boat engines
- Increase watercraft maintenance
- Sharp shells hurt!
- Foul odor





# Impacts: Cultural Hydrilla

- One fragment can lead to introduction
- Shades out competitors
- Millions of dollars are spent in Florida and California on control.
- Clogs water delivery canals



Hydrilla infestation  
Winnamoochee River, Florida  
Photo by Brian Nelson  
Copyright 1997 Southwest Florida Water Management District

# Impacts: Human Health Lionfish and Cholera



**NOTICE.**

**PREVENTIVES OF**

**CHOLERA!**

Published by order of the Sanitary Committee, under the sanction of the Medical Council.

**BE TEMPERATE IN EATING & DRINKING!**  
*Avoid Raw Vegetables and Unripe Fruit!*

Abstain from **COLD WATER**, when heated, and above all from *Ardent Spirits*, and if habit have rendered them indispensable, take much less than usual.

**SLEEP AND CLOTHE WARM!**  
**DO NOT SLEEP OR SIT IN A DRAUGHT OF AIR.**  
Avoid getting Wet!

Attend immediately to all disorders of the **Bowels.**

**TAKE NO MEDICINE WITHOUT ADVICE.**

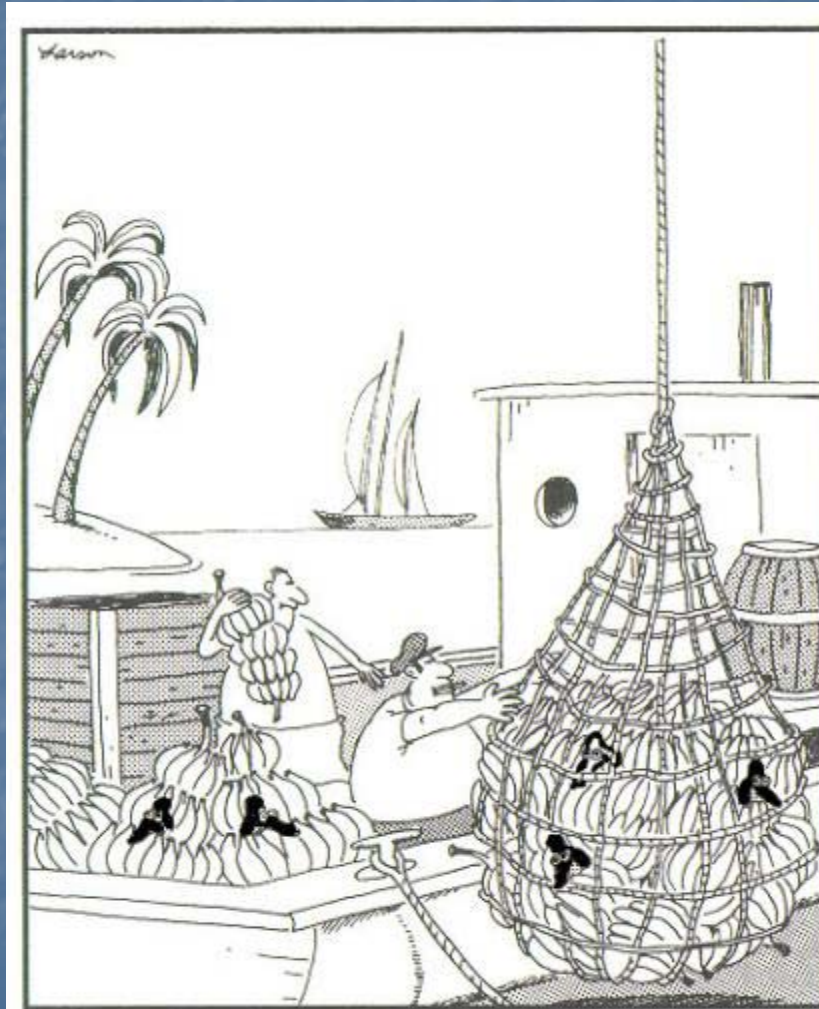
Medicine and Medical Advice can be had by day or night, at all hours of the day and night, by applying to the Station House in each Ward.

CALEB S. WOODHULL, Mayor.  
JAMES KELLY, Chairman of Sanitary Committee.

## List of Invasive Species Reported in the Great Lakes

<i>Acanthostomum</i> sp. (digenean fluke)	<i>Diatoma ehrenbergii</i> (diatom)	<i>Mentha gentilis</i> (creeping whorled mint)	<i>Radix auricularia</i> (European ear snail)
<i>Acentropus niveus</i> (aquatic moth)	<i>Dreissena bugensis</i> (quagga mussel)	<i>Mentha piperita</i> (peppermint)	<i>Ranavirus</i> sp. (Largemouth Bass Virus)
<i>Acineta nitocrae</i> (suctorian)	<i>Dreissena polymorpha</i> (zebra mussel)	<i>Mentha spicata</i> (spearmint)	<i>Renibacterium salmoninarum</i> (Bacterial Kidney Disease)
<i>Actinocyclus normanii</i> fo. <i>Subsalsa</i> (diatom)	<i>Dugesia polychroa</i> (flatworm)	<i>Misgurnus anguillicaudatus</i> (Oriental weatherfish)	<i>Rhabdovirus carpio</i> (SVC spring viraemia of carp)
<i>Aeromonas salmonicida</i> (furunculosis)	<i>Echinochloa crusgalli</i> (barnyard grass)	<i>Morone americana</i> (white perch)	<i>Rhamnus frangula</i> (glossy buckthorn)
<i>Agrostis gigantea</i> (redtop)	<i>Echinogammarus ischnus</i> (amphipod)	<i>Myosotis scorpioides</i> (true forget-me-not)	<i>Ripistes parasite</i> (oligochaete)
<i>Alnus glutinosa</i> (black alder)	<i>Elimia virginica</i> (snail)	<i>Myriophyllum spicatum</i> (Eurasian watermilfoil)	<i>Rorippa nasturtium</i> (aquaticum water cress)
<i>Alopecurus geniculatus</i> (water foxtail)	<i>Enneacanthus gloriosus</i> (bluespotted sunfish)	<i>Myxobolus cerebralis</i> (salmonid whirling disease)	<i>Rorippa sylvestris</i> (creeping yellow cress)
<i>Alosa aestivialis</i> blueback (herring)	<i>Enteromorpha flexuosa</i> (green alga)	<i>Najas marina</i> (spiny naiad)	<i>Rumex longifolius</i> (yard dock)
<i>Alosa pseudoharengus</i> (alewife)	<i>Enteromorpha intestinalis</i> (green alga)	<i>Najas minor</i> (minor naiad)	<i>Rumex obtusifolius</i> (bitter dock)
<i>Apeltes quadracus</i> (fourspine stickleback)	<i>Enteromorpha prolifera</i> (green alga)	<i>Neascus brevicaudatus</i> (digenean fluke)	<i>Salix alba</i> (white willow)
<i>Argulus japonicus</i> (parasitic copepod)	<i>Epilobium hirsutum</i> (great hairy willow herb)	<i>Neogorgiasius japonicus</i> (copepod)	<i>Salix fragilis</i> (crack willow)
<i>Bangia atropurpurea</i> (red alga)	<i>Epilobium parviflorum</i> (flowered willow herb)	<i>Neogobius melanostomus</i> (round goby)	<i>Salix purpurea</i> (purple willow)
<i>Biddulphia laevis</i> (diatom)	<i>Eubosmina coregoni</i> (waterflea)	<i>Nitellopsis obtuse</i> (green alga)	<i>Salmincola lotae</i> (copepod)
<i>Bithynia tentaculata</i> (faucet snail)	<i>Eurytemora affinis</i> (calanoid copepod)	<i>Nitocra hibernica</i> (harpacticoid copepod)	<i>Salmo trutta</i> (brown trout)
<i>Bosmina maritima</i> (waterflea)	<i>Gambusia affinis</i> (western mosquitofish)	<i>Nitocra incerta</i> (harpacticoid copepod)	<i>Scardinius erythrophthalmus</i> (rudd)
<i>Branchiura sowerbyi</i> (oligochaete)	<i>Gammarus tigrinus</i> (amphipod)	<i>Notropis buchanani</i> (ghost shiner)	<i>Schizopera borutzkyi</i> (harpacticoid copepod)
<i>Butomus umbellatus</i> (flowering rush)	<i>Gianius (Phalloidrilus) aquaedulcis</i> (oligochaete)	<i>Noturus insignis</i> (margined madtom)	<i>Scolex pleuronectis</i> (cestode)
<i>Bythotrephes longimanus</i> (spiny waterflea)	<i>Gillia altilis</i> (snail)	<i>Novirhabdovirus</i> sp. (VHS)	<i>Skeletonema potamos</i> (diatom)
<i>Cabomba caroliniana</i> (fanwort)	<i>Glugea hertwigi</i> (protozoan)	<i>Nymphoides peltata</i> (yellow floating heart)	<i>Skeletonema subsalsum</i> (diatom)
<i>Carassius auratus</i> (goldfish)	<i>Glyceria maxima</i> (reed sweet-grass)	<i>Oncorhynchus gorbuscha</i> (pink salmon)	<i>Skistodiamptomus pallidus</i> (calanoid copepod)
<i>Carex acutiformis</i> (swamp sedge)	<i>Gymnocephalus cernuus</i> (Eurasian ruffe)	<i>Oncorhynchus kisutch</i> (coho salmon)	<i>Solanum dulcamara</i> (bittersweet nightshade)
<i>Carex disticha</i> (sedge)	<i>Hemimysis anomala</i> (bloody-red mysid)	<i>Oncorhynchus mykiss</i> (rainbow trout)	<i>Solidago sempervirens</i> (seaside goldenrod)
<i>Carex flacca</i> (sedge)	<i>Heterosyllus nr. nuni</i> (harpacticoid copepod)	<i>Oncorhynchus nerka</i> (kokanee)	<i>Sonchus arvensis</i> (field sow thistle)
<i>Cercopagis pengoi</i> (fish-hook waterflea)	<i>Heterosporis</i> sp. (microsporidian)	<i>Oncorhynchus tshawytscha</i> (chinook salmon)	<i>Sonchus arvensis</i> (smooth field sow thistle)
<i>Chaetoceros hohnii</i> (diatom)	<i>Hydrocharis morsus-ranae</i> (European frogbit)	<i>Osmerus mordax</i> (rainbow smelt)	<i>Sparganium glomeratum</i> (bur reed)
<i>Chenopodium glaucum</i> (oak leaved goose foot)	<i>Hymenomonas roseola</i> (cocco-lithophorid alga)	<i>Phenacobius mirabilis</i> (suckermouth minnow)	<i>Sphacelaria fluviatilis</i> (brown alga)
<i>Chroodactylon ramosum</i> (red alga)	<i>Ichthyocotylurus pileatus</i> (digenean fluke)	<i>Piscirickettsia cf. salmonis</i> (muskie pox)	<i>Sphacelaria lacustris</i> (brown alga)
<i>Cipangopaludina chinensis malleata</i> (Oriental mystery snail)	<i>Impatiens glandulifera</i> (Indian balsam)	<i>Psidium amnicum</i> (pea clam)	<i>Sphaerium cornutum</i> (fingernail clam)
<i>Cipangopaludina japonica</i> (Oriental mystery snail)	<i>Iris pseudacorus</i> (yellow flag)	<i>Psidium henslowanum</i> (henslow's pea clam)	<i>Sphaeromyxa sevastopoli</i> (mixosporidian)
<i>Cirsium palustre</i> (marsh thistle)	<i>Juncus inflexus</i> (rush)	<i>Psidium moitessierianum</i> (pea clam)	<i>Stellaria aquatica</i> (giant chickweed)
<i>Conium maculatum</i> (poison hemlock)	<i>Juncus compressus</i> (flattened rush)	<i>Psidium supinum</i> (humpback pea clam)	<i>Stephanodiscus binderanus</i> (diatom)
<i>Corbicula fluminea</i> (Asiatic clam)	<i>Juncus gerardii</i> (black-grass rush)	<i>Pluchea odorata</i> (salt-marsh fleabane)	<i>Stephanodiscus subtilis</i> (diatom)
<i>Cordytophora caspia</i> (hydroid)	<i>Lasmigona subviridis</i> (mussel)	<i>Pluchea odorata</i> (salt-marsh fleabane)	<i>Tanysphyrus lemnae</i> (aquatic weevil)
<i>Craspedacusta sowerbyi</i> (freshwater jellyfish)	<i>Lepisosteus platostomus</i> (shortnose gar)	<i>Poa trivialis</i> (rough-stalked meadow grass)	<i>Thalassiosira baltica</i> (diatom)
<i>Cyclops strenuus</i> (copepod)	<i>Lepomis humilis</i> (orange spotted sunfish)	<i>Polygonum caespitosum</i> (Bristly Lady's Thumb)	<i>Thalassiosira guillardii</i> (diatom)
<i>Cyclotella atomus</i> (diatom)	<i>Lepomis microlophus</i> (redear sunfish)	<i>Polygonum persicaria</i> (lady's thumb)	<i>Thalassiosira lacustris</i> (diatom)
<i>Cyclotella cryptica</i> (diatom)	<i>Lophopodella carteri</i> (bryozoan)	<i>Potamogeton crispus</i> (curlyleaf pondweed)	<i>Thalassiosira pseudonana</i> (diatom)
<i>Cyclotella pseudostelligera</i> (diatom)	<i>Lotus corniculatus</i> (birdsfoot trefoil)	<i>Potamopyrgus antipodarum</i> (New Zealand mud snail)	<i>Thalassiosira weissflogii</i> (diatom)
<i>Cyclotella wofterekei</i> (diatom)	<i>Lupinus polyphyllus</i> (lupine)	<i>Potamothenix bedoti</i> (oligochaete)	<i>Trapa natans</i> (water chestnut)
<i>Cylindropermopsis raciborskii</i> (cyanobacterium)	<i>Lycopus asper</i> (western water horehound)	<i>Potamothenix moldaviensis</i> (oligochaete)	<i>Trypanosoma aceriniae</i> (flagellate)
<i>Cyprinus carpio</i> (common carp)	<i>Lycopus europaeus</i> (European water horehound)	<i>Potamothenix vejvodskyi</i> (oligochaete)	<i>Typha angustifolia</i> (narrow leaved cattail)
<i>Dactylogyrus amphibothrium</i> (monogenetic fluke)	<i>Lysimachia nummularia</i> (moneywort)	<i>Proterorhinus marmoratus</i> (tubenose goby)	<i>Valvata piscinalis</i> (European valve snail)
<i>Dactylogyrus hemiamphibothrium</i> (monogenetic fluke)	<i>Lysimachia vulgaris</i> (garden loosestrife)	<i>Psammonobiotus communis</i> (testate amoeba)	<i>Veronica beccabunga</i> (European brookline)
<i>Daphnia galeata galeata</i> (waterflea)	<i>Lythrum salicaria</i> (purple loosestrife)	<i>Psammonobiotus dziwnowi</i> (testate amoeba)	<i>Viviparus georgianus</i> (banded mystery snail)
<i>Daphnia lumholzi</i> (waterflea)	<i>Marsilea quadrifolia</i> (European water clover)	<i>Psammonobiotus linearis</i> (testate amoeba)	
	<i>Megacyclops viridis</i> (cyclopoid copepod)	<i>Puccinellia distans</i> (weeping alkali grass)	

# Pathways and Vectors

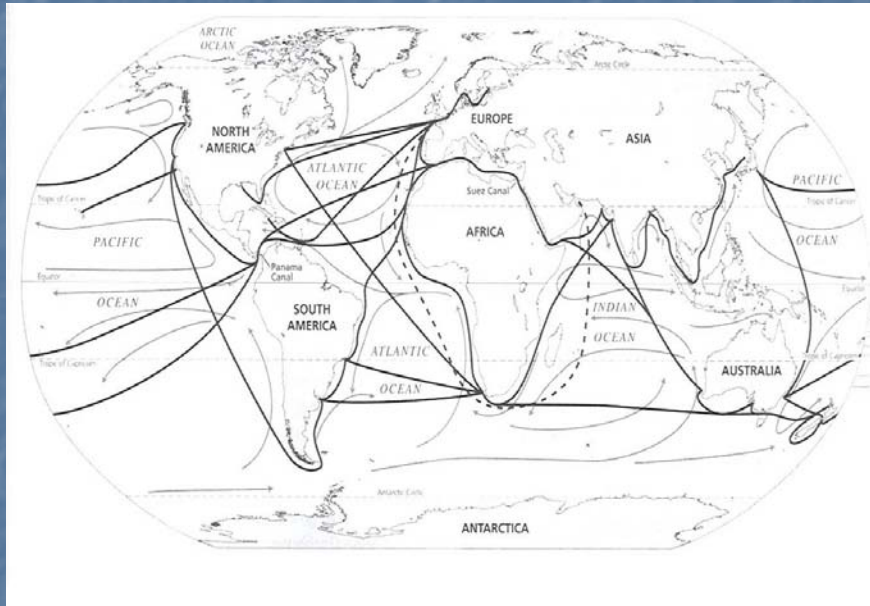


How Poodles Came to America

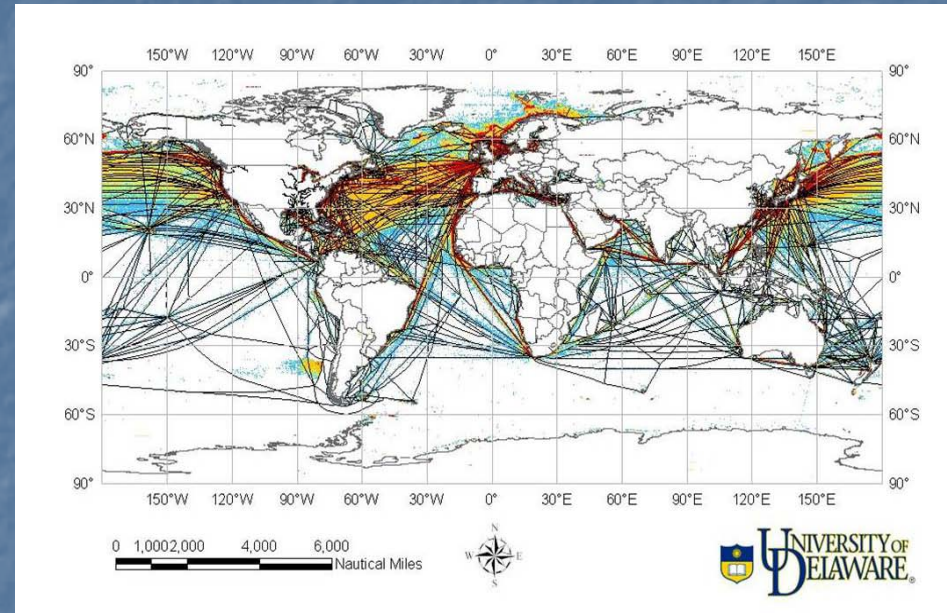
# Daily Flights, Global Pathways



# Global Shipping Traffic



Main Ocean Stream Routes  
1850s to 1950s



Main Ocean Stream Routes  
Today

# Pathways of Introduction

## How do they get here:

- Ballast water operations
- Biofouling of ship hulls
- Release of unwanted pets and fishing bait
- Release or escape of classroom and laboratory animals
- Escape from aquaculture facilities, nurseries, or water gardens
- Intentionally stocked as food or recreational sources
- Released as biological control of existing an existing invader
- Introduced for habitat restoration or erosion control efforts



# Pathways of Introduction

How they are spread once there are here:

A single pathway may have many non-target vertebrates, plants, invertebrates, microbes...



- Natural Resource Management Activities
- Fire Management
- Restoration activities
- Vehicles and Construction Equipment
- Recreational Watercraft and Trailers
- Outdoor Recreation (hiking, fishing...)





# Invasive Species National Laws and Regulations

- Lacey Act
- Non-indigenous Aquatic Nuisance Prevention and Control Act
- National Invasive Species Act
- Executive Order 13112

## Executive Order 13112 of February 3, 1999 -- Invasive Species

a) Each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law...

**(3) not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere** unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

# Preventing the Spread of Invasive Species

"An ounce of prevention is worth a pound of cure."



***“But we already have basic decontamination procedures....”***

**HACCP :**

- **Step-by-step method to consider all pathways**
- **Targets control actions for “best” opportunity**
- **Methods to ensure prevention is successful**
- **Contingency plan if problem surfaces**
- **Documentation process**



# What is HACCP?

- Key components
- HACCP is a process
- Planning is Essential





## Origin of HACCP

⑩ 30 years ago—"...a program for the astronauts focuses on **preventing** hazards that could cause food-borne illnesses by applying science-based **controls**, from raw material to finished products." U.S. FDA website

⑩ <http://www.cfsan.fda.gov/~lrd/bghaccp.html>



# HACCP for NRM

- Sea Grant develops AIS-HACCP

## AIS-HACCP

Aquatic Invasive Species - Hazard Analysis and Critical Control Point



- USFWS modified HACCP for resource management activities

## Five EASY Steps to HACCP Planning

Step 1 – Activity Description

Step 2 – Activity Flow Chart

Step 3 – Identify Potential Non-targets

Step 4 – Non-Target Assessment Worksheet (NTAW)

Step 5 – Non-Target Risk Action Plan (NTRAP)



# Starting Out in the Right Direction

Management Commitment

HACCP Training

HACCP Team Assembly



# Case Studies: When HACCP Could Have Helped

## Inks Dam National Fish Hatchery (NFH)

- NFH located in TX near the CO River
- Raises and stocks bass (Target)
- Gizzard shad abundant in water used by NFH (Non-Target)



## Inks Dam NFH

Provides largemouth bass fingerlings to  
New Mexico's Morgan Lake



Gizzard Shad



## How not to run a media campaign:

- Gizzard shad reported in Lake Powell in 2000
- Likely from Morgan Lake population.
- Bad Press

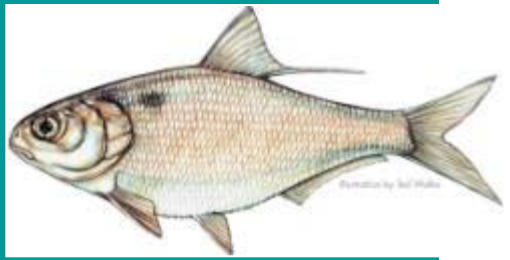
### **Fish and Wildlife Blunders in Lake Powell**

by Skip Knowles  
*The Salt Lake Tribune*

Tuesday,  
August 27, 2002

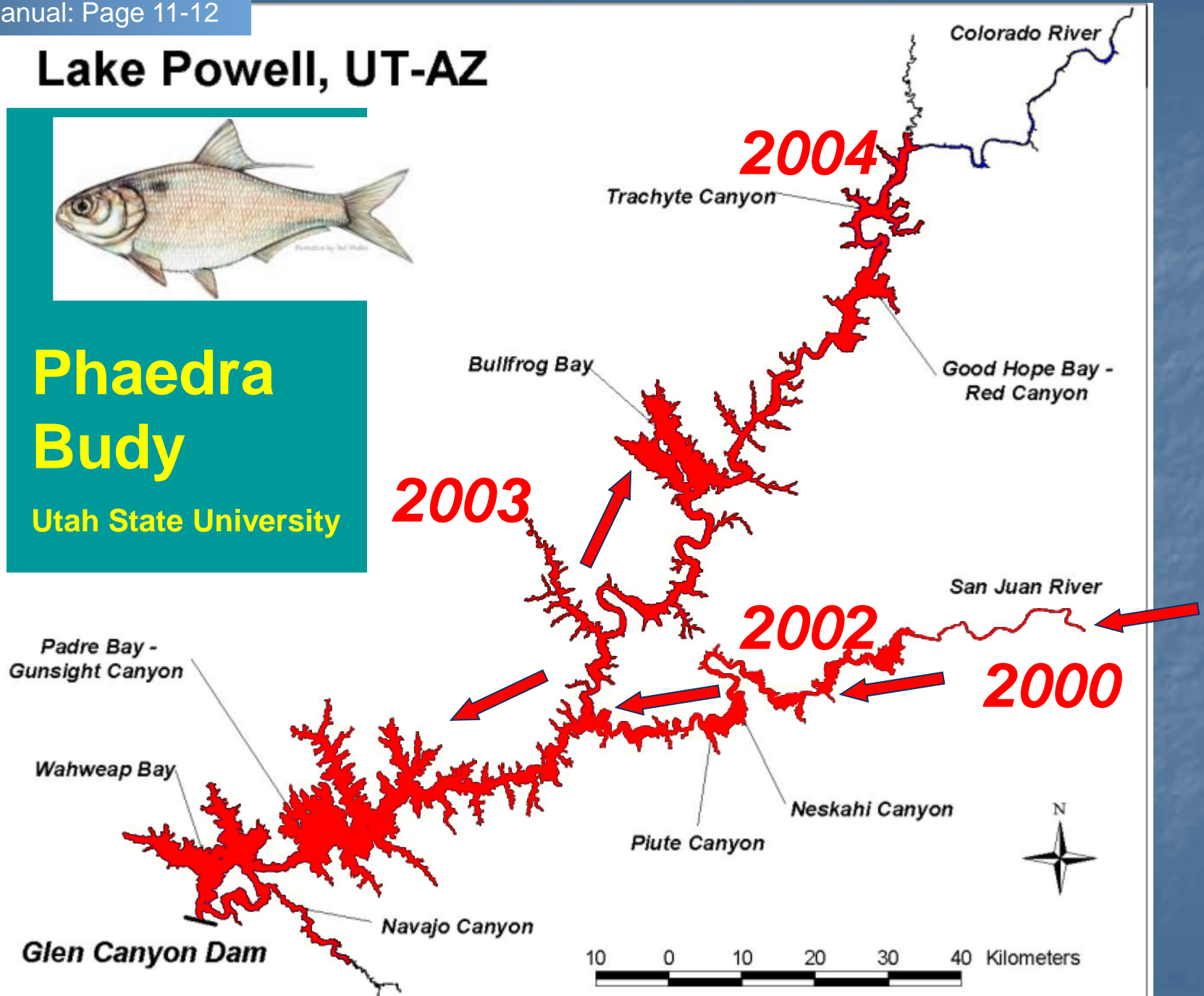
After years of telling Utah biologists to forget about stocking gizzard shad in Lake Powell because of concern for sensitive species, the U.S. Fish and Wildlife Service accidentally did just that.

# Lake Powell, UT-AZ



**Phaedra  
Budy**

Utah State University



# Planning is Everything!

*Managing Natural Resource Pathways*

# HACCP

HACCP Could Have Prevented this  
"Hatchery Release"



# Case Studies: When HACCP Could Have Helped

## Ridgefield National Wildlife Refuge

- NWR located in WA along the Columbia River
- Wetland plant seed from Sacramento Valley brought on site for restoration project (Target)
- Eurasian ricefield bulrush (non-target) germinated in restoration site in 2000



## Ridgefield National Wildlife Refuge - Grabbing the Bulrush By The Horns

- 8 wetlands originally contaminated
- At least 6 additional wetlands infested as bulrush spread via water flow and other pathways
- Refuge staff and volunteers now must invest resources into long-term monitoring and control



Volunteers search for and remove invasive ricefield bulrush from River S Unit



# Planning is Everything!

*Managing Natural Resource Pathways*

# HACCP

Could HACCP have protected the Refuge and its inhabitants from this invasive weed?



# Step 1 - Activity Description

## ISRAP Step 1 – Activity Description

<b>Management Objective &amp; Contact Information</b>	
Management Objective:	Contact Person:
	Phone:
	Email:

<b>Activity Description</b> i.e. Who; What; Where; When; How; Why

## Activity Description

Examples of activities include, but are not limited to...

- Forest thinning operations
- Raising and/or stocking of fish and other organisms
- Wildland fire fighting
- Field surveys (aquatic and terrestrial)
- Habitat restoration projects
- Research field work
- Road construction and maintenance
- Trail building and maintenance
- Introducing an organism for biological control
- Landscaping
- Invasive plant removal projects



# Activity Description Components Key Questions

Who  
What  
When  
Where  
Why  
How



# Activity Description Components

## Who:

- Who is the project coordinator
- Who is the site manager
- Who are the hands-on-folks or crew
- i.e. who comprises "THE TEAM"



# Activity Description Components

## What

- What is the activity or action

# Activity Description Components

## Where

- General
  - State wide
  - Refuge
  - Watershed
- Site specific
  - GPS coordinates
  - Stream/lake name

# Activity Description Components

## When

- Finite time
  - Time specific
  - One time occurrence
  - Continuously occurring
    - Maintenance
    - Annual surveys
    - Seasonal fish stocking



# Activity Description Components

## How

- Actions within the planned activity

# Activity Description Components

## Why

- What is the need and objective of the action/activity

# Hypothetical Example

(Manual page 16)

- Cutthroat Trout National Fish Hatchery staff measure riparian vegetation densities within the Thompson River Basin once a month throughout the year.
- The purpose is to gather information on riparian habitat to guide cutthroat trout recovery actions within the basin.
- Within the Thompson Basin, several potential invasive species, parasites or diseases have been determined to be of significant concern.

## HACCP Step 1 – Activity Description

### Management Objective & Contact Information

Title: Hypothetical HACCP Plan

Management Objective:  
Habitat survey for the recovery of cutthroat trout (CT)

Contact Person: Jonathan Thompson

Phone: (800) LUV-FISH

Email: jonathan\_thompson@fws.gov

### Activity Description

i.e. Who; What; Where; When; How; Why

**Who:** Cutthroat Trout National Fish Hatchery personnel

**What:** Measurement of Riparian Vegetation Density

**Where:** Thompson River Basin

**When:** Year-round, once a month

**How:** Retrieve the appropriate gear from a warehouse at the beginning of the day. Travel to the sampling site and conduct the sampling activity. Return to the warehouse. Gear is unloaded and stored.

**Why:** To gather data and information on riparian habitat to guide cutthroat trout recover actions

# Step 2 – Activity Flow Chart

## HACCP Step 2 – Activity Flow Chart Outline Sequential Tasks of Activity

<b>Task 1</b>	<b>Title:</b>
	<b>Description:</b>



<b>Task 2</b>	<b>Title:</b>
	<b>Description:</b>



<b>Task 3</b>	<b>Title:</b>
	<b>Description:</b>



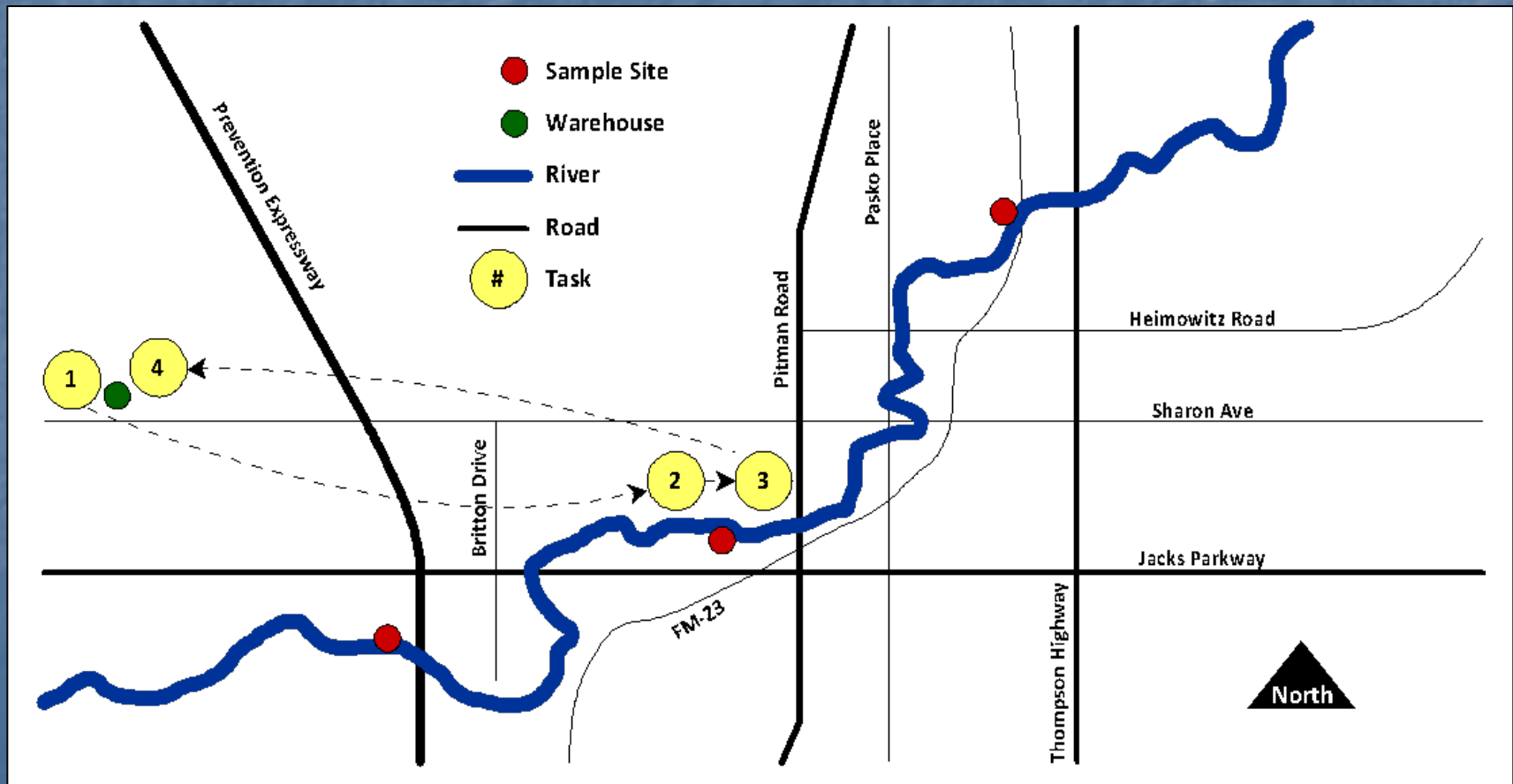
<b>Task 4</b>	<b>Title:</b>
	<b>Description:</b>

## What is a Flow Chart?

- Break activity into tasks
- It is an outline of the activity
- Records what should happen, not what does
- List the most basic steps
- Each task is given a number, simple title, and brief description

## What is a Flow Diagram?

- Useful for visualizing the activity
- Aide to the risk analysis
- Simple to create... does not have to be fancy



## Lumpers Vs. Splitters

“Lumpers” – lumps task within an activity making it difficult to distinguish specific prevention opportunities.

“Splitters” – splits tasks within an activity causing there to be too many tasks

A HACCP plan will not be effective if the tasks defined for your activity are too narrow or too broadly defined. Be specific yet concise.






Best Management  
Practices



Tasks

# How is the Flow Chart used?

- The tasks are analyzed for the risk of spreading invasive species
- The **Non-Target Analysis Worksheet (Step 4)**

<b>HACCP Step 2 – Activity Flow Chart</b>	
Outline Sequential Tasks of Activity	
Task 1	Title: Load Gear and Drive to site
	Description: Drive to warehouse and load appropriate gear for sampling activity. Drive to sampling site.
	
Task 2	Title: Unload gear and conduct survey
	Description: Unload gear from vehicle. Prepare gear to conduct sampling. Conduct survey.
	
Task 3	Title: Reload gear
	Description: Return to vehicle and I pack up gear.
	
Task 4	Title: Return to warehouse and unload gear.
	Description: Return to the warehouse in vehicle with gear. Put equipment away to store for next use.

# Step 3 – Identify Potential Non-targets

## HACCP Step 3 – Identify Potential Non-Targets

**Non-Targets That May Potentially Be Moved/Introduced**

**Vertebrates:**

**Invertebrates:**

**Plants:**

**Other Organisms (pathogens, parasites, etc.):**

# Key HACCP Terminology

## Target:

Whatever is intentionally being moved from place to place (can be species or object).

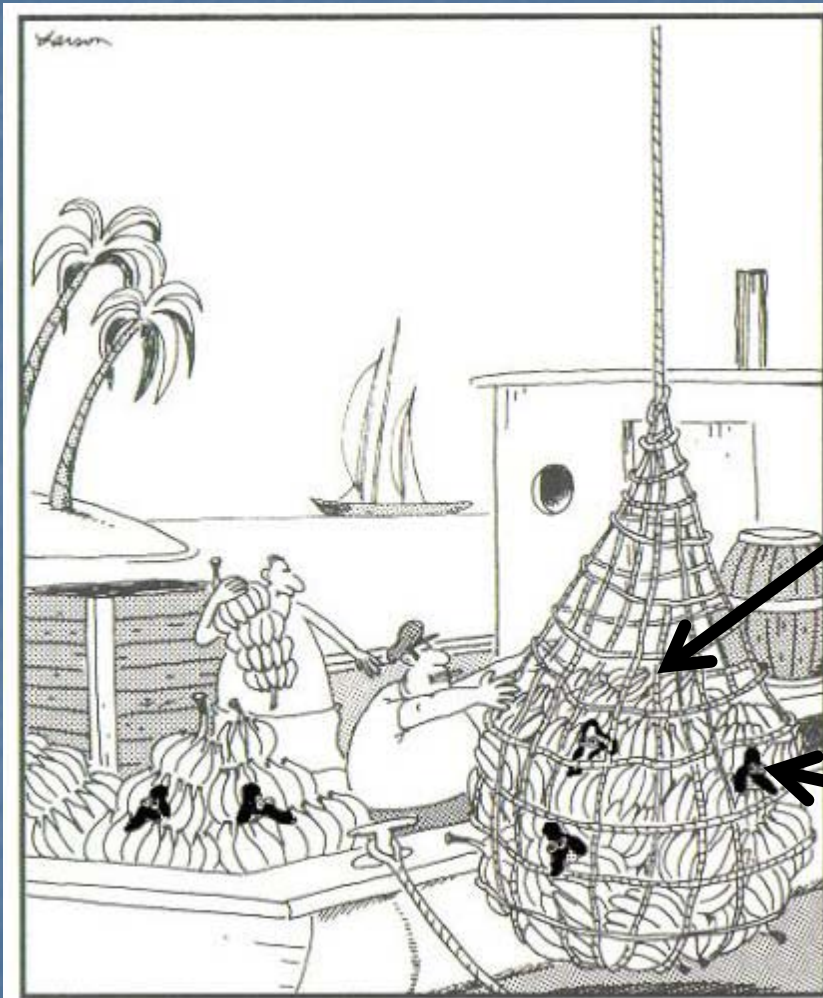


## Non-target:

Any species that may be present in the action area, but is not the species for which an action was initiated



# Target versus Non-target



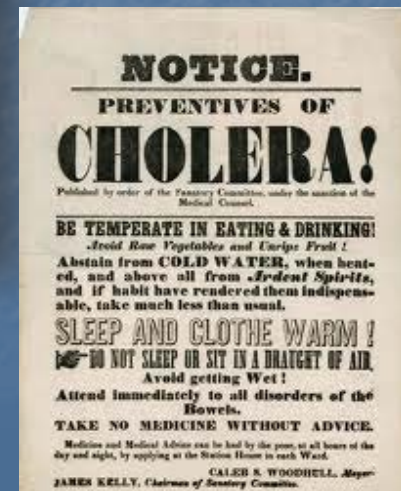
Bananas are a Target

Poodles are a Non-target

How Poodles Came to America

# Non-Target Species

- Vertebrates
- Invertebrates
- Plants
- Other Organisms



## Developing Potential Non-Target List

- Does not have to be a full list of non-native species.
- If there is a potential to spread even one species, HACCP will prevent the spread of others of that type
- Can be very general
- Requires Local Experts
- If you're HACCP team is on the fence whether something should or should not be listed as a potential target, it probably should be listed



**(Some) Resources to Identify Non-Target Species**

**USGS NAS (Non-indigenous Aquatic Species) Database**

<http://nas.er.usgs.gov>

**Great Lakes Aquatic Nonindigenous Species  
Information System (GLANSIS)**

<http://www.glerl.noaa.gov/res/Programs/ncrais/glansis.html>

**National Exotic Marine and Estuarine Species  
Information System (NEMESIS)**

<http://invasions.si.edu/nemesis>

**USDA Plants Database**

<http://plants.usda.gov/java/noxiousDriver>

**NISbase - The International Nonindigenous Species  
Database Network**

<http://www.nisbase.org>



## HACCP Step 3 – Identify Potential Non-Targets

### Non-Targets That May Potentially Be Moved/Introduced

**Vertebrates:**

Amphibians

Bullfrog (*Rana catesbeiana*)

**Invertebrates:**

New Zealand Mudsail (*Potamopyrgus antipodarum*)

**Plants:**

Eurasian milfoil (*Myriophyllum spicatum*)

Purple loosestrife (*Lythrum salicaria*)

**Other Organisms (pathogens, parasites, etc.):**

Chytrid fungus

Whirling disease (*Myxobolus cerebralis*)



# Step 4: Module 1: Non-Target Analysis Worksheet

## HACCP Step 4 – Non-Target Analysis Worksheet

1	2	3	4	5	6	7
<b>Tasks</b>  (From Step 2)	<b>Potential Non-targets</b>  (From Step 3)	<b>Risk Assessment</b>  Are any non-targets significant?  Yes or No	<b>Justification</b>  Justify your answer in Column 3	<b>Control</b>  What control measures can be applied during this task to reduce the risk of non-targets?	<b>CCP?</b>  Is this task a CCP?  Yes or No	<b>Justification</b>  Justify your answer in Column 6

<b>Task #</b>  <b>Title:</b>	<i>Vertebrates</i>					
	<i>Invertebrates</i>					
	<i>Plants</i>					
	<i>Others</i>					

# How do Steps 2-3 fit into the NTAW?

## HACCP Step 4 – Non-Target Analysis Worksheet

<b>1</b> <b>Tasks</b>  (From Step 2)	<b>2</b> <b>Potential Non-targets</b>  (From Step 3)	<b>3</b> <b>Risk Assessment</b>  Are any non-targets significant? Yes or No	<b>4</b> <b>Justification</b>  Justify your answer in Column 3	<b>5</b> <b>Control</b>  What control measures can be applied during this task to stop the spread of non-targets?	<b>6</b> <b>CCP?</b>  Is this task a CCP? Yes or No	<b>7</b> <b>Justification</b>  Why is this task a CCP or why is it not?
---	---	---	---	--	---	--

<b>Task #1</b>  <b>Title:</b> Load gear and drive to site	Vertebrates					
	Amphibians, including bullfrogs					
	Invertebrates					
	NZMS Plants					
	Eurasian milfoil Purple loosestrife					
	Others  Cheered fungus Whirling disease					

# Risk

- Precautionary Principle

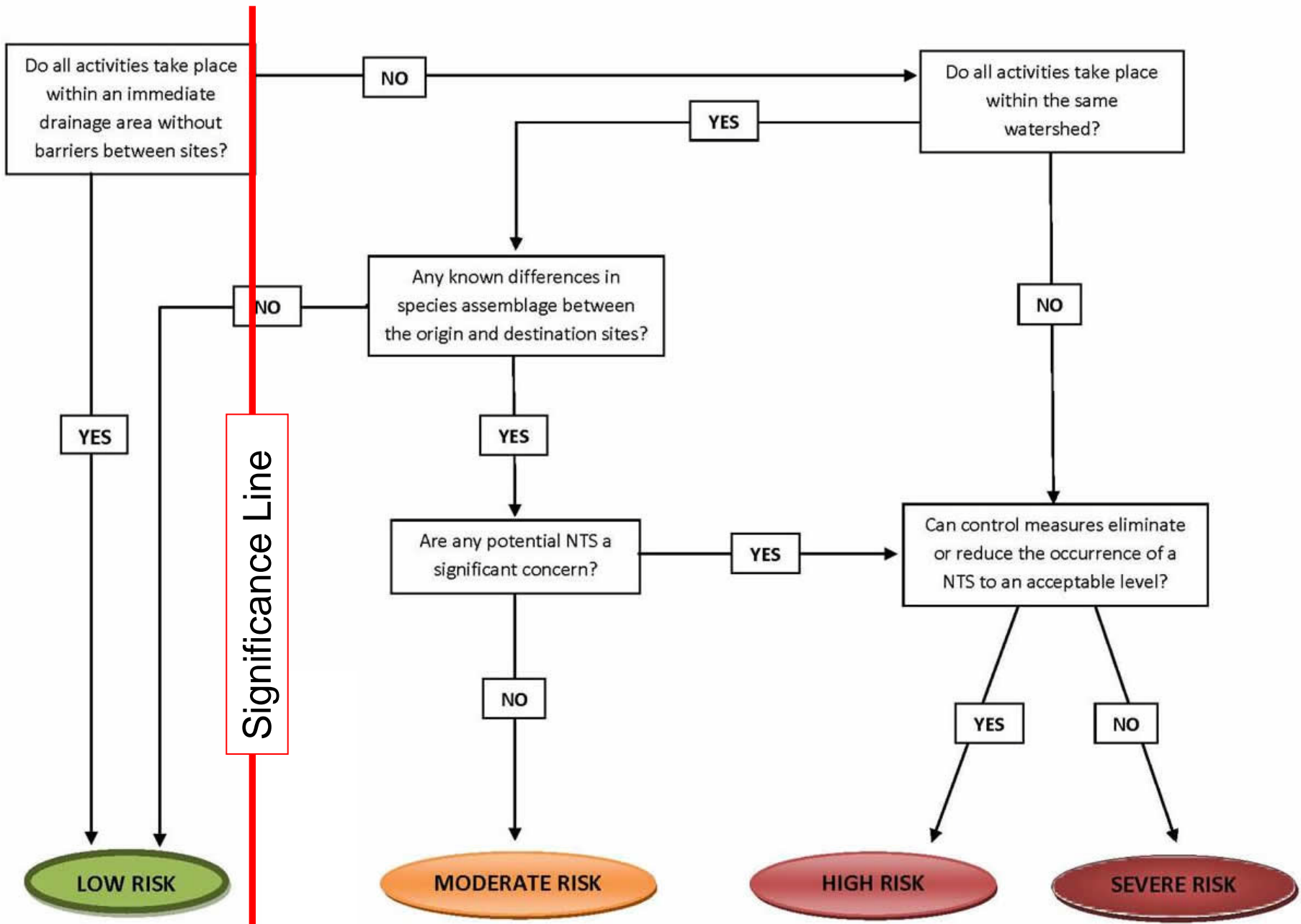
HACCP Manual: Pages 8

- Risk Assumptions for this course

HACCP Manual: Pages 30

- Risk Management vs. Risk Assessment

HACCP Manual: Pages 33



### HACCP Step 4 – Non-Target Analysis Worksheet

<b>1</b> <b>Tasks</b>  (From Step 2)	<b>2</b> <b>Potential Non-targets</b>  (From Step 3)	<b>3</b> <b>Risk Assessment</b>  Are any non-targets significant? Yes or No	<b>4</b> <b>Justification</b>  Justify your answer in Column 3	<b>5</b> <b>Control</b>  What control measures can be applied during this task to stop the spread of non-targets?	<b>6</b> <b>CCP?</b>  Is this task a CCP? Yes or No	<b>7</b> <b>Justification</b>  Why is this task a CCP or why is it not?
<b>Task #1</b>  <b>Title:</b> Load gear and drive to site	<b>Vertebrates</b>	No				
	<b>Amphibians, including bullfrogs</b>					
	Invertebrates	No				
	<b>NZMS</b>	No				
	<b>Plants</b>  Eurasian milfoil Purple loosestrife					
<b>Others</b>  Cheered fungus Whirling disease	No					

### HACCP Step 4 – Non-Target Analysis Worksheet

<b>1</b> <b>Tasks</b>  (From Step 2)	<b>2</b> <b>Potential Non-targets</b>  (From Step 3)	<b>3</b> <b>Risk Assessment</b>  Are any non-targets significant? Yes or No	<b>4</b> <b>Justification</b>  Justify your answer in Column 3	<b>5</b> <b>Control</b>  What control measures can be applied during this task to stop the spread of non-targets?	<b>6</b> <b>CCP?</b>  Is this task a CCP? Yes or No	<b>7</b> <b>Justification</b>  Why is this task a CCP or why is it not?
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<b>Task #1</b>  Title: Load gear and drive to site	Vertebrates  Amphibians, including bullfrogs	No				
	Invertebrates	No				
	NZMS Plants					
	Eurasian milfoil Purple loosestrife	No				
	Others  Cheered fungus Whirling disease	No				



## HACCP Step 4 – Non-Target Analysis Worksheet

1	2	3	4	5	6	7
<b>Tasks</b>	<b>Potential Non-targets</b>	<b>Risk Assessment</b>	<b>Justification</b>	<b>Control</b>	<b>CCP?</b>	<b>Justification</b>
(From Step 2)	(From Step 3)	Are any non-targets significant?  Yes or No	Justify your answer in Column 3	What control measures can be applied during this task to stop the spread of non-targets?	Is this task a CCP?  Yes or No	Justify your answer in Column 6

<b>Task #1</b>  Title: Load gear and drive to site	Vertebrates Amphibians, including bullfrogs	No	Risk is low because all equipment was cleaned and disinfected following prior use			
	Invertebrates NZMS	No				
	Plants Eurasian milfoil Purple loosestrife	No				
	Others Chytrid fungus Whirling disease	No				

<b>Task #2</b>  <b>Title:</b> <b>Unload gear and conduct sampling</b>	Vertebrates Amphibians, including bullfrogs	No	Risk is low because sampling occurs only at one location, plus all equipment was cleaned and disinfected before storage			
	Invertebrates NZMS	No				
	Plants Eurasian milfoil Purple loosestrife	No				
	Others Chytrid fungus Whirling disease	No				

## HACCP Step 4 – Non-Target Analysis Worksheet

1	2	3	4	5	6	7
<b>Tasks</b>	<b>Potential Non-targets</b>	<b>Risk Assessment</b>	<b>Justification</b>	<b>Control</b>	<b>CCP?</b>	<b>Justification</b>
(From Step 2)	(From Step 3)	Are any non-targets significant?  Yes or No	Justify your answer in Column 3	What control measures can be applied during this task to stop the spread of non-targets?	Is this task a CCP?  Yes or No	Justify your answer in Column 6

<b>Task #3</b>  Title: Reload gear	Vertebrates Amphibians, including bullfrogs	Yes	High risk that bullfrog eggs or adults may be in gear after sampling			
	Invertebrates NZMS	Yes	High risk that invertebrates could be in gear after sampling			
	Plants Eurasian milfoil Purple loosestrife	Yes	High risk that plants or seeds could be attached to gear after sampling			
	Others Chytrid fungus Whirling disease	Yes	High risk that unwanted organisms could survive on gear			

<b>Task #4</b>  <b>Title:</b> <b>Return to warehouse and unload gear</b>	Vertebrates Amphibians, including bullfrogs	Yes	High risk that bullfrog eggs or adults may be in gear after sampling			I
	Invertebrates NZMS	Yes	High risk that invertebrates could be in gear after sampling			
	Plants Eurasian milfoil Purple loosestrife	Yes	High risk that plants or seeds could be attached to gear after sampling			
	Others Chytrid fungus Whirling disease	Yes	High risk that unwanted organisms could survive on gear			

# *Control Measures* – Actions that can be used to control and remove identified non-targets.

Method	Example
Chemical decontamination	Soak or spray equipment for at least 1 minute with a 2% bleach solution. If invasive pathogens or diseases are suspected, a 10% solution should be used
Desiccation	Allow for 5 days of drying time before reuse.
Freezing	Expose equipment to 14 F for 2 hours
Manual Removal	Brush, Vacuum, Adhesive Roller
Heat Treatment	Use of steam, hot air, or hot water to bring an object's surface temperature up to 140 F for 30 seconds.
Water Washing	Pressure wash vehicles at minimum of 90 pounds per square inch (psi).
Dedicated Equipment	Wading gear only used in specific watershed
Managing Field Operations	Sampling a stream from upstream to downstream

# Step 4: Module 2: Non-Target Analysis Worksheet

## HACCP Step 4 – Non-Target Analysis Worksheet

<b>1</b> <b>Tasks</b>  (From Step 2)	<b>2</b> <b>Potential Non-targets</b>  (From Step 3)	<b>3</b> <b>Risk Assessment</b>  Are any non-targets significant? Yes or No	<b>4</b> <b>Justification</b>  Justify your answer in Column 3	<b>5</b> <b>Control</b>  What control measures can be applied during this task to stop the spread of non-targets?	<b>6</b> <b>CCP?</b>  Is this task a CCP? Yes or No	<b>7</b> <b>Justification</b>  Why is this task a CCP or why is it not?
---	---	---	---	--	---	--

<b>Task #1</b>  <b>Title:</b> Load gear and drive to site	Vertebrates Amphibians, including bullfrogs	No	Risk is low because all equipment was cleaned and disinfected following prior use			
	Invertebrates	No				
	NZMS Plants	No				
	Eurasian milfoil Purple loosestrife	No				
	Others Cheered fungus Whirling disease	No				

### HACCP Step 4 – Non-Target Analysis Worksheet

<b>1</b> <b>Tasks</b>  (From Step 2)	<b>2</b> <b>Potential Non-targets</b>  (From Step 3)	<b>3</b> <b>Risk Assessment</b>  Are any non-targets significant? Yes or No	<b>4</b> <b>Justification</b>  Justify your answer in Column 3	<b>5</b> <b>Control</b>  What control measures can be applied during this task to stop the spread of non-targets?	<b>6</b> <b>CCP?</b>  Is this task a CCP? Yes or No	<b>7</b> <b>Justification</b>  Why is this task a CCP or why is it not?
---	---	---	---	--	---	--

<b>Task #1</b>  <b>Title:</b> Load gear and drive to site	Vertebrates	No	Risk is low because all equipment was cleaned and disinfected following prior use					
	Amphibians, including bullfrogs	No		Invertebrates	No			
	NZMS			Plants	No			
	Eurasian milfoil Purple loosestrife	No		Others	No			
	Cheered fungus Whirling disease							

### HACCP Step 4 – Non-Target Analysis Worksheet

<b>1</b> <b>Tasks</b>  (From Step 2)	<b>2</b> <b>Potential Non-targets</b>  (From Step 3)	<b>3</b> <b>Risk Assessment</b>  Are any non-targets significant? Yes or No	<b>4</b> <b>Justification</b>  Justify your answer in Column 3	<b>5</b> <b>Control</b>  What control measures can be applied during this task to stop the spread of non-targets?	<b>6</b> <b>CCP?</b>  Is this task a CCP? Yes or No	<b>7</b> <b>Justification</b>  Why is this task a CCP or why is it not?
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<b>Task #2</b>  <b>Title:</b> Unload gear and conduct sampling	<b>Vertebrates</b>  Amphibians, including bullfrogs	No	Risk is low because sampling occurs only at one location, plus all equipment was cleaned and disinfected before storage			
	Invertebrates	No				
	NZMS Plants Eurasian milfoil Purple loosestrife	No				
	Others Cheered fungus Whirling disease	No				



### HACCP Step 4 – Non-Target Analysis Worksheet

1 Tasks  (From Step 2)	2 Potential Non-targets  (From Step 3)	3 Risk Assessment  Are any non-targets significant? Yes or No	4 Justification  Justify your answer in Column 3	5 Control  What control measures can be applied during this task to stop the spread of non-targets?	6 CCP?  Is this task a CCP? Yes or No	7 Justification  Why is this task a CCP or why is it not?
---------------------------------	---	---	---	--	---	--

<b>Task #3</b>  <b>Title:</b> Reload gear	Vertebrates  Amphibians, including bullfrogs	Yes	High risk that bullfrog eggs or adults may be in gear after sampling			
	Invertebrates  NZMS	Yes	High risk that invertebrates could be in gear after sampling			
	Plants  Eurasian milfoil Purple loosestrife	Yes	High risk that plants or seeds could be attached to gear after sampling			
	Others  Cheered fungus Whirling disease	Yes	High risk that unwanted organisms could survive on gear			

1	2	3	4	5	6	7
<b>Tasks</b>	<b>Potential Non-targets</b>	<b>Risk Assessment</b>	<b>Justification</b>	<b>Control</b>	<b>CCP?</b>	<b>Justification</b>
(From Step 2)	(From Step 3)	Are any non-targets significant?  Yes or No	Justify your answer in Column 3	What control measures can be applied during this task to stop the spread of non-targets?	Is this task a CCP?  Yes or No	Justify your answer in Column 6
Task #3  Title: Reload gear	Vertebrates Amphibians, including bullfrogs	Yes	High risk that bullfrog eggs or adults may be in gear after sampling	Visually inspect all gear for non-targets and remove anything found by hand before proceeding to Task #4		
	Invertebrates NZMS	Yes	High risk that invertebrates could be in gear after sampling			
	Plants Eurasian milfoil Purple loosestrife	Yes	High risk that plants or seeds could be attached to gear after sampling			
	Others Chytrid fungus Whirling disease	Yes	High risk that unwanted organisms could survive on gear			

<b>Task #4</b>  <b>Title:</b> <b>Return to warehouse and unload gear</b>	Vertebrates Amphibians, including bullfrogs	Yes	High risk that bullfrog eggs or adults may be in gear after sampling	Remove any vertebrates then clean and disinfect all equipment using approved disinfectant solution to kill eggs.	
	Invertebrates NZMS	Yes	High risk that invertebrates could be in gear after sampling	Clean and disinfect all equipment using approved disinfectant solution.	
	Plants Eurasian milfoil Purple loosestrife	Yes	High risk that plants or seeds could be attached to gear after sampling	Clean and disinfect all equipment using approved disinfectant solution and rinse undercarriage of vehicles with high-pressure water spray.	
	Others Chytrid fungus Whirling disease	Yes	High risk that unwanted organisms could survive on gear	Clean and disinfect all equipment using approved disinfectant solution.	

## HACCP Teamwork

What is the right control measure?

Decisions a team must make:

- 1) Is the control measure effective at reducing the non-target risk?
- 2) Is the control measure appropriate for the severity of the non-target risk?

What is an acceptable level of risk?

- Minimizing vs. eliminating risk
- Experts are Important

# Step 4: Non-Target Analysis Worksheet

## HACCP Step 4 – Non-Target Analysis Worksheet

<b>1</b> <b>Tasks</b>  (From Step 2)	<b>2</b> <b>Potential Non-targets</b>  (From Step 3)	<b>3</b> <b>Risk Assessment</b>  Are any non-targets significant? Yes or No	<b>4</b> <b>Justification</b>  Justify your answer in Column 3	<b>5</b> <b>Control</b>  What control measures can be applied during this task to stop the spread of non-targets?	<b>6</b> <b>CCP?</b>  Is this task a CCP? Yes or No	<b>7</b> <b>Justification</b>  Why is this task a CCP or why is it not?
---	---	---	---	--	---	--

<b>Task #1</b>  <b>Title:</b>	<b>Vertebrates</b>					
	<b>Invertebrates</b>					
	<b>Plants</b>					
	<b>Others</b>					

***Control Measures** – Actions that can be used to control and remove identified non-targets.*

***Control Point** – the point during an activity at which potential hazards are controlled by a control measure. Control points may be optional or critical.*

***Optional Control Point*** – control point where control measures can be applied to prevent or reduce the risk of significant non-target hazards.

Although NOT critical, still may be important to help reducing any non-targets within the activity.

***Critical Control Point*** – the best point at which significant hazards can be prevented or reduced to minimum risk.

Critical control points are those in which control measures *are essential* for preventing the spread of non-target hazards.

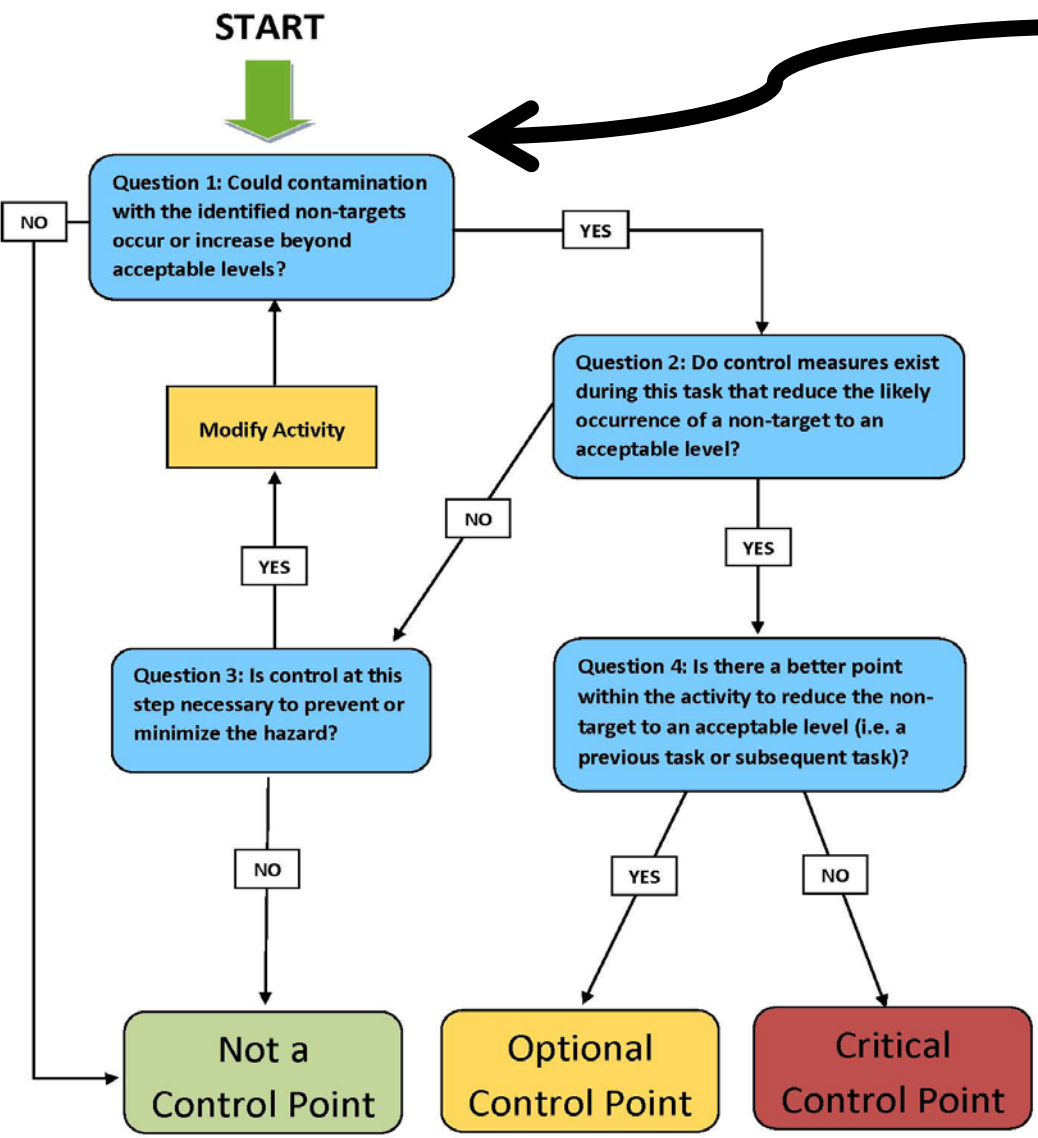
# Control Points

- Differentiating between Critical Control Points and Optional Control Points varies from activity to activity and depends on the uniqueness of the activity.
- Often, the best place to control a non-target is at the point of entry. But this is not always true
- How to determine if a control point is optional or critical?
- We have a decision tree...



# CCP Decision Tree

## Critical Control Point Decision Tree



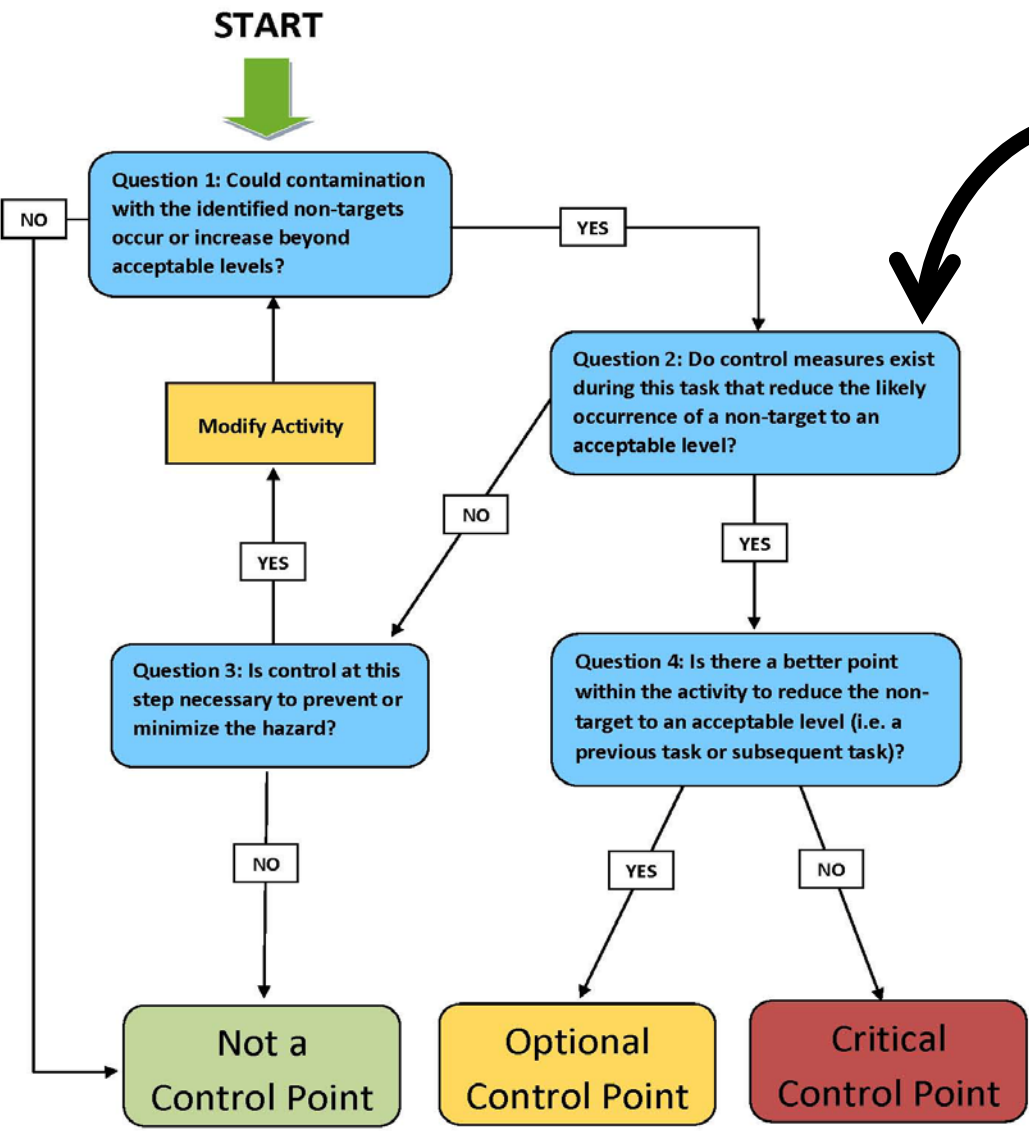
Could contamination with the identified non-targets occur or increase beyond acceptable levels?



### Critical Control Point Decision Tree

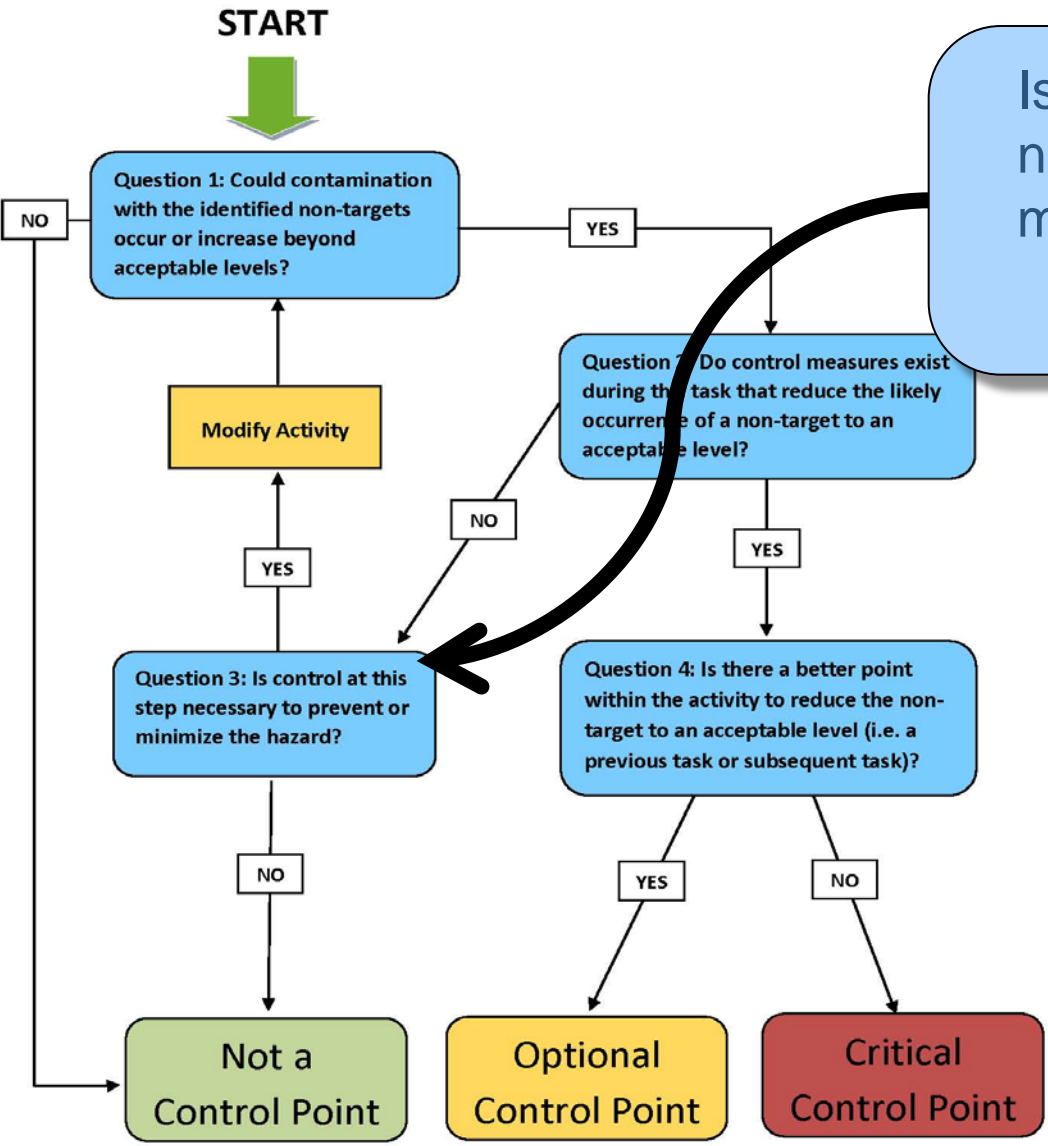
# CCP Decision Tree

Do control measures exist during this task that reduce the likely occurrence of a non-target to an acceptable level?



### Critical Control Point Decision Tree

# CCP Decision Tree

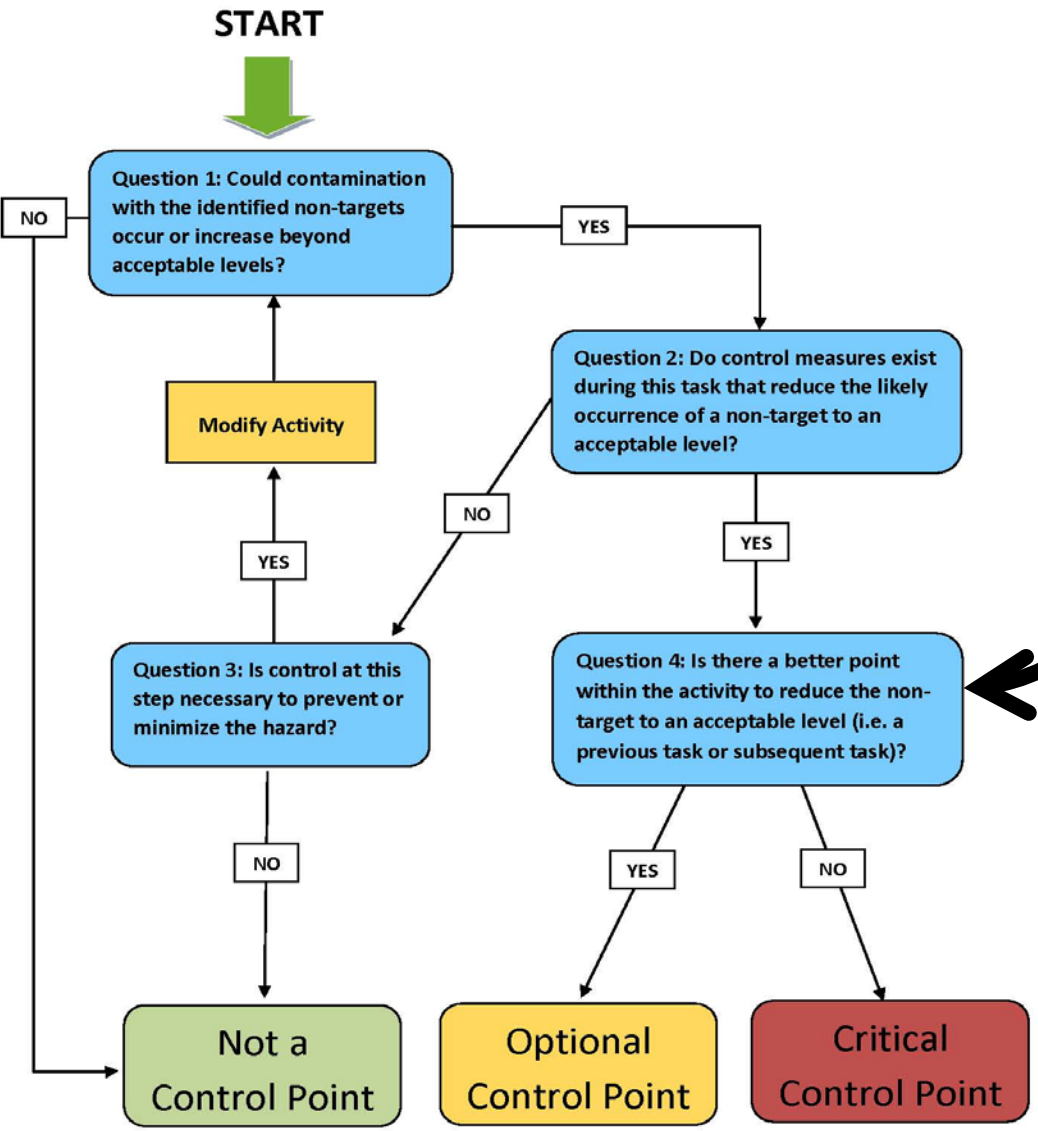


Is control during this task necessary to prevent or minimize the non-targets?

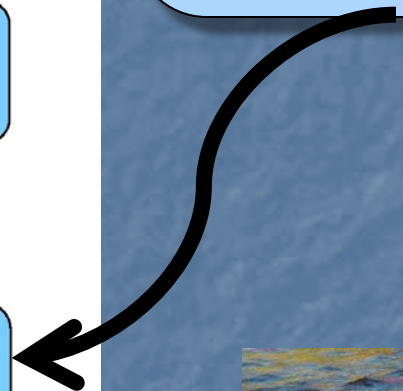


### Critical Control Point Decision Tree

# CCP Decision Tree



Is there a better point within the activity to reduce the non-target to an acceptable level (i.e. a previous or subsequent task)?



# Control Points

- Did you find any CCP's?

HACCP Manual: Page 38

- Did you have too many CCP's?

HACCP Manual: Page 42

- Are the instances where it is OK to have multiple CCP's?

HACCP Manual: Page 42

### HACCP Step 4 – Non-Target Analysis Worksheet

<b>1</b> <b>Tasks</b>  (From Step 2)	<b>2</b> <b>Potential Non-targets</b>  (From Step 3)	<b>3</b> <b>Risk Assessment</b>  Are any non-targets significant? Yes or No	<b>4</b> <b>Justification</b>  Justify your answer in Column 3	<b>5</b> <b>Control</b>  What control measures can be applied during this task to stop the spread of non-targets?	<b>6</b> <b>CCP?</b>  Is this task a CCP? Yes or No	<b>7</b> <b>Justification</b>  Why is this task a CCP or why is it not?
---	---	---	---	--	---	--

<b>Task #1</b>  <b>Title:</b> Load gear and drive to site	Vertebrates  Amphibians, including bullfrogs	No	Risk is low because all equipment was cleaned and disinfected following prior use	N/A	No	There are no significant non-targets during this task.
	Invertebrates  NZMS	No		N/A	No	
	Plants  Eurasian milfoil Purple loosestrife	No		N/A	No	
	Others  Cheered fungus Whirling disease	No		N/A	No	

### HACCP Step 4 – Non-Target Analysis Worksheet

<b>1</b> <b>Tasks</b>  (From Step 2)	<b>2</b> <b>Potential Non-targets</b>  (From Step 3)	<b>3</b> <b>Risk Assessment</b>  Are any non-targets significant? Yes or No	<b>4</b> <b>Justification</b>  Justify your answer in Column 3	<b>5</b> <b>Control</b>  What control measures can be applied during this task to stop the spread of non-targets?	<b>6</b> <b>CCP?</b>  Is this task a CCP? Yes or No	<b>7</b> <b>Justification</b>  Why is this task a CCP or why is it not?
---	---	---	---	--	---	--

<b>Task #2</b>  <b>Title:</b> Unload gear and conduct sampling	<b>Vertebrates</b>  Amphibians, including bullfrogs	No	Risk is low because sampling occurs only at one location, plus all equipment was cleaned and disinfected before storage	N/A	No	There are no significant non-targets during this task.
	Invertebrates	No		N/A	No	
	NZMS Plants Eurasian milfoil Purple loosestrife	No		N/A	No	
	Others Cheered fungus Whirling disease	No		N/A	No	

### HACCP Step 4 – Non-Target Analysis Worksheet

1 Tasks  (From Step 2)	2 Potential Non-targets  (From Step 3)	3 Risk Assessment  Are any non-targets significant? Yes or No	4 Justification  Justify your answer in Column 3	5 Control  What control measures can be applied during this task to stop the spread of non-targets?	6 CCP?  Is this task a CCP? Yes or No	7 Justification  Why is this task a CCP or why is it not?
---------------------------------	---	---	---	--	---	--

<b>Task #3</b>  <b>Title:</b> Reload gear	<b>Vertebrates</b>  Amphibians, including bullfrogs	Yes	High risk that bullfrog eggs or adults may be in gear after sampling	Visually inspect all gear for non-targets and remove anything found by hand before proceeding to Task #4	No	Hand removal, cleaning, and disinfecting would be better accomplished in Task #4 at a decontamination station back at the warehouse.
	Invertebrates  NZMS	Yes	High risk that invertebrates could be in gear after sampling		No	
	Plants  Eurasian milfoil Purple loosestrife	Yes	High risk that plants or seeds could be attached to gear after sampling		No	
	Others  Cheered fungus Whirling disease	Yes	High risk that unwanted organisms could survive on gear		No	



### HACCP Step 4 – Non-Target Analysis Worksheet

1 Tasks  (From Step 2)	2 Potential Non-targets  (From Step 3)	3 Risk Assessment  Are any non-targets significant? Yes or No	4 Justification  Justify your answer in Column 3	5 Control  What control measures can be applied during this task to stop the spread of non-targets?	6 CCP?  Is this task a CCP? Yes or No	7 Justification  Why is this task a CCP or why is it not?
---------------------------------	--	--	---	--	---	--

<b>Task #4</b>  <b>Title:</b> Return to warehouse and unload gear	Vertebrates	No	High risk that bullfrog eggs or adults may be in gear after sampling	Remove any vertebrates then clean and disinfect all equipment using approved disinfectant solution to kill eggs.	Yes	If the equipment is not decontaminated during this task, then it will not be clean for use next time it is needed. This task is the point of no return.
	Amphibians, including bullfrogs	No	High risk that invertebrates could be in gear after sampling	Clean and disinfect all equipment using approved disinfectant solution.	Yes	
	Invertebrates  NZMS	No	High risk that plants or seeds could be attached to gear after sampling	Clean and disinfect all equipment using approved disinfectant solution and rinse undercarriage of vehicles with high-pressure water spray.	Yes	
	Plants  Eurasian milfoil Purple loosestrife	No	High risk that unwanted organisms could survive on gear	Clean and disinfect all equipment using approved disinfectant solution.	Yes	
	Others  Cheered fungus Whirling disease	No				

# Step 5: Non-Target Risk Action Plan (NTRAP)

HACCP Step 5 – Non-Target Risk Action Plan (NTRAP)			
(Use this form for any "Yes" from Column 6 of HACCP Step 4 - Non-Target Analysis Worksheet) One page for each Critical Control Point			
Mangement Objective From Step 1			
Critical Control Point: Task #	4	Title:	
Significant Non-Target(s) (Step 4, Column 3)			
Control Measure(s) (Step 4, Column 5)			
Precribed ranges, limits, or criteria for control measure(s): (PRCL)			
Monitoring the Control Measure(s)	Who?		
	How?		
	Where?		
	How often?		
Corrective Action(s) if Control Measures Fail (or PRLC cannot be met)			
Supporting Documents (For example, Management Plan, Checklist, Decontamination Techniques, SOPs, Scientific Journal Articles, etc.)			
Development Team Members			
Date Developed:		Date(s) Reviewed:	

*\* all gray fields are required*

## HACCP Step 5 – Non-Target Risk Action Plan (NTRAP)

(Use this form for any "Yes" from Column 6 of HACCP Step 4 - Non-Target Analysis Worksheet)  
One page for each Critical Control Point

<b>Management Objective From Step 1</b>		<b>Habitat Survey for the Recovery of Cutthroat Trout (CT)</b>	
<b>Critical Control Point: Task #</b>	<b>4</b>	<b>Title:</b>	Return to warehouse and unload gear
<b>Significant Non-Target(s) (Step 4, Column 3)</b>		Vertebrates, Invertebrates, Plants, and Other Organisms (All listed in step 3)	
<b>Control Measure(s) (Step 4, Column 5)</b>		Clean and disinfect all equipment using approved disinfectant solution	
<b>Prescribed ranges, limits, or criteria for control measure(s): (PRCL)</b>		Use disinfectant solution that contains quaternary ammonium mixed at a concentration of at least 1% but no more than 3%. Contact time with gear must be at least 10 minutes.	
<b>Monitoring the Control Measure(s)</b>	<b>Who?</b>	Hatchery staff	
	<b>How?</b>	Check immersion time with timer. Ensure concentration is correct with AQA1507 Quaternary Ammonium Test Kit (or similar)	
	<b>Where?</b>	Decontamination station at the warehouse	
	<b>How often?</b>	Every time that gear is unloaded and stored	
<b>Corrective Action(s) if Control Measures Fail (or PRLC cannot be met)</b>		Mix new (fresh) dosage of disinfectant solution and repeat the cleaning/disinfectant procedure from the beginning. If gear cannot be disinfected, it must be clearly tagged as "contaminated" and isolated until it can be disinfected before being allowed back in the field.	

### HACCP Step 5 – Non-Target Risk Action Plan (NTRAP)

(Use this form for any "Yes" from Column 6 of HACCP Step 4 - Non-Target Analysis Worksheet) One page for each Critical Control Point	
Mangement Objective From Step 1	Habitat Survey for the Recovery of Cutthroat Trout (CT)
Critical Control Point: Task #	4 Title: Return to warehouse and unload gear
Significant Non-Target(s) (Step 4, Column 3)	Vertebrates, Invertebrates, Plants, and Other Organisms (All listed in step 3)
Control Measure(s) (Step 4, Column 5)	Clean and disinfect all equipment using approved disinfectant solution
Precribed ranges, limits, or criteria for control measure(s): (PRCL)	Use disinfectant solution that contains quaternary ammonium mixed at a concentration of at least 1% but no more than 3%. Contact time with gear must be at least 10 minutes.
Monitoring the Control Measure(s)	Who? Hatchery staff
	How? Check immersion time with timer. Ensure concentration is correct with AQA1507 Quaternary Ammonium Test Kit (or similar)
	Where? Decontamination station at the warehouse
	How often? Every time that gear is unloaded and stored
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Supporting Documents

(For example, Management Plan, Checklist, Decontamination Techniques, SOPs.

## HACCP Step 5 – Non-Target Risk Action Plan (NTRAP)

(Use this form for any "Yes" from Column 6 of HACCP Step 4 - Non-Target Analysis Worksheet) One page for each Critical Control Point	
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Critical Control Point: Task #	4 Title: Return to warehouse and unload gear
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Monitoring the Control Measure(s)	Who? Hatchery staff
	How? Check immersion time with timer. Ensure concentration is correct with AQA1507 Quaternary Ammonium Test Kit (or similar)
	Where? Decontamination station at the warehouse
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## Supporting Documents

(For example, Management Plan, Checklist, Decontamination Techniques, SOPs, Scientific Journal Articles, etc.)

## HACCP Step 5 – Non-Target Risk Action Plan (NTRAP)

(Use this form for any "Yes" from Column 6 of HACCP Step 4 - Non-Target Analysis Worksheet) One page for each Critical Control Point	
Mangement Objective From Step 1	Habitat Survey for the Recovery of Cutthroat Trout (CT)
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Monitoring the Control Measure(s)	Who? Hatchery staff
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Supporting Documents (For example, Management Plan, Checklist, Decontamination Techniques, SOPs,	

## Prescribed Ranges, Limits, or Criteria

### Prescribed Ranges, Limits, or Criteria (PRLC):

- Previous versions of HACCP refer to this as a “control limit”
- Specific measurable attributes that can be used to determine if control measures are effectively minimizing risk
- Needed to make sure control measure is working

## HACCP Step 5 – Non-Target Risk Action Plan (NTRAP)

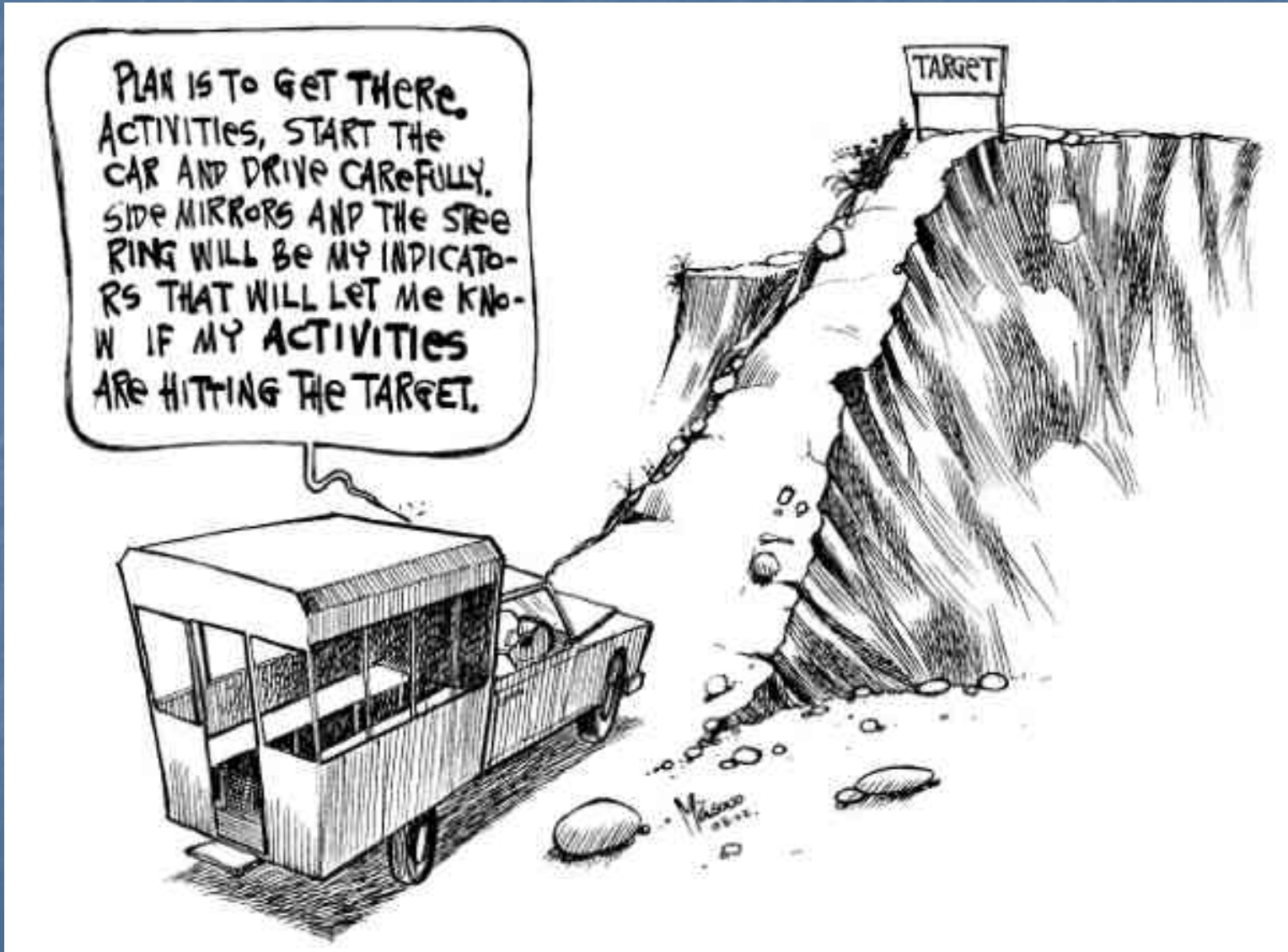
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Mangement Objective From Step 1	Habitat Survey for the Recovery of Cutthroat Trout (CT)
Critical Control Point: Task #	4 Title: Return to warehouse and unload gear
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Monitoring the Control Measure(s)	Who? Hatchery staff
	How? Check immersion time with timer. Ensure concentration is correct with AQA1507 Quaternary Ammonium Test Kit (or similar)
	Where? Decontamination station at the warehouse
	How often? Every time that gear is unloaded and stored
Corrective Action(s) if Control Measures Fail (or PRLC cannot be met)	Mix new (fresh) dosage of disinfectant solution and repeat the cleaning/disinfectant procedure from the beginning. If gear cannot be disinfected, it must be clearly tagged as "contaminated" and isolated until it can be disinfected before being allowed back in the field.

## Supporting Documents

(For example, Management Plan, Checklist, Decontamination Techniques, SOPs,



# Evaluation and Monitoring



Habitat Survey for the Recovery of Cutthroat Trout (CT)

<b>Critical Control Point: Task #</b>	<b>4</b>	<b>Title:</b>	Return to warehouse and unload gear
<b>Significant Non-Target(s) (Step 4, Column 3)</b>	Vertebrates, Invertebrates, Plants, and Other Organisms (All listed in step 3)		
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<b>Monitoring the Control Measure(s)</b>	<b>Who?</b>	Hatchery staff	
	<b>How?</b>	Check immersion time with timer. Ensure concentration is correct with AQA1507 Quaternary Ammonium Test Kit (or similar)	
	<b>Where?</b>	Decontamination station at the warehouse	
	<b>How often?</b>	Every time that gear is unloaded and stored	
<b>Corrective Action(s) if Control Measures Fail (or PRLC cannot be met)</b>	Mix new (fresh) dosage of disinfectant solution and repeat the cleaning/disinfectant procedure from the beginning. If gear cannot be disinfected, it must be clearly tagged as "contaminated" and isolated until it can be disinfected before being allowed back in the field.		
<b>Supporting Documents</b> <i>(For example, Management Plan, Checklist, Decontamination Techniques, SOPs, Scientific Journal Articles, etc.)</i>			
Logan River Sampling Protocol, Louanne River Sampling Protocol, Quaternary Ammonium Disinfectant Information Sheet, Nevada Noxious Weed List, California Noxious Weed List			
<b>Development Team Members</b>	Jonathan Thompson, Ronald Smith, Louanne		

Habitat Survey for the Recovery of Cutthroat Trout (CT)

<b>Critical Control Point: Task #</b>	<b>4</b>	<b>Title:</b>	Return to warehouse and unload gear
<b>Significant Non-Target(s) (Step 4, Column 3)</b>	Vertebrates, Invertebrates, Plants, and Other Organisms (All listed in step 3)		
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	<b>How?</b>	Check immersion time with timer. Ensure concentration is correct with AQA1507 Quaternary Ammonium Test Kit (or similar)	
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<b>Development Team Members</b>	Jonathan Thompson, Ronald Smith, Louanne		

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<b>Monitoring the Control Measure(s)</b>	<b>Who?</b>	Hatchery staff	
	<b>How?</b>	Check immersion time with timer. Ensure concentration is correct with AQA1507 Quaternary Ammonium Test Kit (or similar)	
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	<b>How often?</b>	Every time that gear is unloaded and stored	
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<b>Development Team Members</b>	Jonathan Thompson, Ronald Smith, Louanne		

Habitat Survey for the Recovery of Cutthroat Trout (CT)

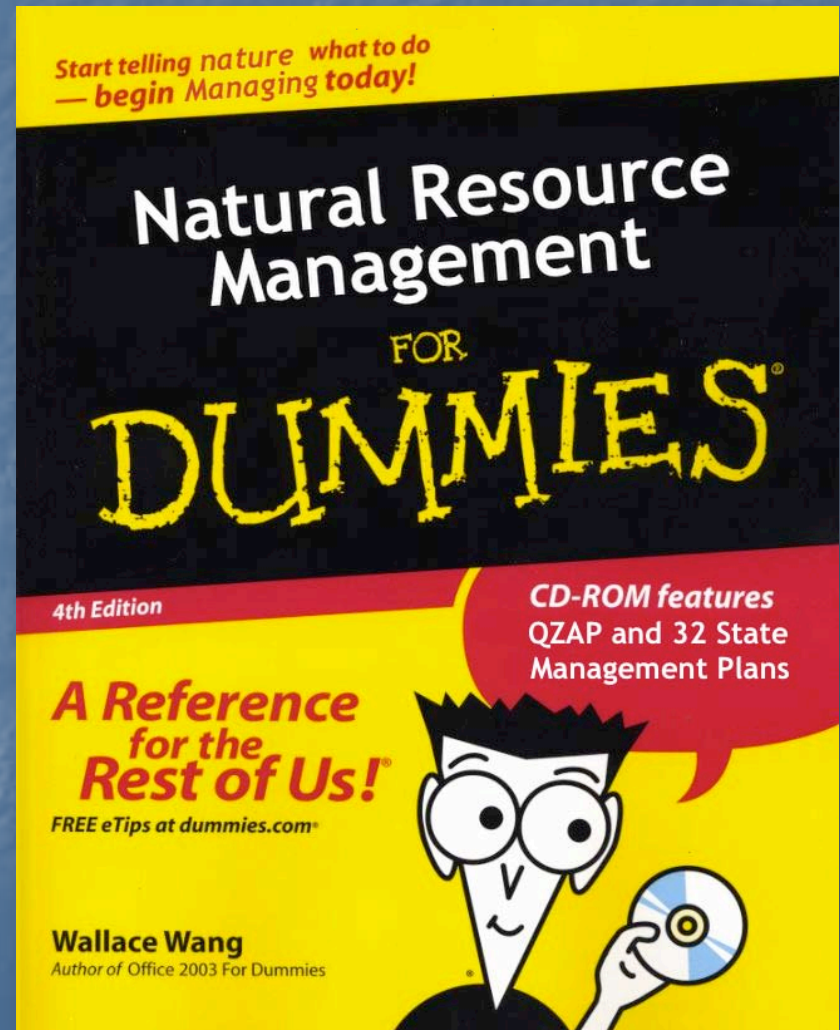
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Monitoring the Control Measure(s)	Who?	Hatchery staff
	How?	Check immersion time with timer. Ensure concentration is correct with AQA1507 Quaternary Ammonium Test Kit (or similar)
	Where?	Decontamination station at the warehouse
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Development Team Members	Jonathan Thompson, Ronald Smith, Louanne	

Criteria for control measure(s): (PRCL)		Use disinfectant solution that contains quaternary ammonium mixed at a concentration of at least 1% but no more than 3%. Contact time with gear must be at least 10 minutes.	
Monitoring the Control Measure(s)	Who?	Hatchery staff	
	How?	Check immersion time with timer. Ensure concentration is correct with AQA1507 Quaternary Ammonium Test Kit (or similar)	
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Development Team Members		Jonathan Thompson, Ronald Smith, Louanne McMartin	
Date Developed:	7/29/2010	Date(s) Reviewed:	Not yet reviewed

\* all gray fields are required

## Supporting Documents

The purpose of supporting documentation is for validation, to provide objective evidence that all essential elements of the plan have a scientific basis and represent a valid approach to controlling the pathway hazards.



Who?	Hatchery staff
How?	Check immersion time with timer. Ensure concentration is correct with AQA1507 Quaternary Ammonium Test Kit (or similar)
Where?	Decontamination station at the warehouse
How often?	Every time that gear is unloaded and stored

Corrective Action(s) if Control Measures Fail (or PRLC cannot be met)	Mix new (fresh) dosage of disinfectant solution and repeat the cleaning/disinfectant procedure from the beginning. If gear cannot be disinfected, it must be clearly tagged as "contaminated" and isolated until it can be disinfected before being allowed back in the field.
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**Supporting Documents**  
*(For example, Management Plan, Checklist, Decontamination Techniques, SOPs, Scientific Journal Articles, etc.)*  
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Development Team Members	Jonathan Thompson, Ronald Smith, Louanne McMartin
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Date Developed:	7/29/2010	Date(s) Reviewed:	Not yet reviewed
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*\* all gray fields are required*



How? Concentration is correct with AQA1007 Quaternary Ammonium Test Kit (or similar)

	<b>Where?</b>	Decontamination station at the warehouse	
	<b>How often?</b>	Every time that gear is unloaded and stored	

<b>Corrective Action(s) if Control Measures Fail (or PRLC cannot be met)</b>	Mix new (fresh) dosage of disinfectant solution and repeat the cleaning/disinfectant procedure from the beginning. If gear cannot be disinfected, it must be clearly tagged as "contaminated" and isolated until it can be disinfected before being allowed back in the field.
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<b>Development Team Members</b>		Jonathan Thompson, Ronald Smith, Louanne McMartin	
<b>Date Developed:</b>	7/29/2010	<b>Date(s) Reviewed:</b>	Not yet reviewed

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# Chapter 5: Implementing HACCP

**Living Document**

HACCP Manual: Page 52

**Supporting Documents**

HACCP Manual: Page 52

**Sharing Plans**

HACCP Manual: Page 53

**Website and Resources**

HACCP Manual: Chapter 7

**Stewardship**

HACCP Manual: Page 53



# The End... Questions?

