

## Mechanized Wetland Management Activity Post-Monitoring Guidelines

### Introduction

This document is to be used as a supplement to the Massachusetts Best Management Practices and Guidance for Freshwater Mosquito Control. These guidelines are operational in scope, representing accepted and consistent procedures within the limitations of a clear statutory mandate and finite funding for the purpose of controlling mosquitoes. It highlights a recommended approach for work in mosquito habitats or in habitats that may be prone to mosquito development.

Wetland management activities are conducted for a number of reasons though typically MCDs select sites which have a history of or habitat characteristics consistent with, supporting immature mosquito development. It is important to recognize that these activities occur under specific statutory authority, that being Chapter 252 of the Massachusetts General Laws.

#### CHAPTER 252. IMPROVEMENT OF LOW LAND AND SWAMPS

##### IMPROVEMENT OF LOW LAND

###### Chapter 252: Section 1. General provisions

If it is necessary or useful (1) to drain or flow a meadow, swamp, marsh, beach or other low land held by two or more proprietors, **or** (2) to remove obstructions in rivers or streams leading thereto or therefrom, **or** (3) to eradicate mosquitoes in any area infested thereby, including, in respect to each such purpose, purposes incidental thereto, such improvements may be made as provided in this chapter.

Upon the completion of a mechanical wetlands management project, personnel may conduct a series of site visits for a period of approximately two years in order to monitor and evaluate the efficacy of the activity (if applicable) and extent of site recovery and stabilization. If potential problems associated with the implementation of physical alterations to the site are observed by MCDs, action will be taken to remedy the problem.

### **Post-Monitoring Review Procedure:**

- **Cause and Effect** – If personnel observe deterioration of site conditions which can be directly associated with outside influences (previously or newly noted) e.g. sedimentation or erosion being caused by off-site stormwater structures or construction sites, culverts of inadequate size, culverts blocking flow or fish passage, inappropriate dumping, it should be noted.
- **Erosion Control Structures**- Erosion control structures should be inspected to evaluate effectiveness of treatment in accordance with the BMP site inspection schedule as follows or until the site has stabilized whichever comes first:

- Inspection Schedule
  - 0-2 weeks                      within two weeks of project completion
  - Up to 6 months              Following rains or weather events of significant proportion to re-flood the habitat (not to exceed once / month)
  - 1 Year                            at the peak of first growing season
  - 2 Year                            at the peak of second growing season
  
- Remediation measures if necessary should take place as soon as can be scheduled (no later than a month) to prevent potential negative impacts to the environment and to ensure the success of the project. This may include but is not limited to additional alterations, and adding or enhancing existing erosion control measures.
  
- Personnel should record additional erosion control strategies utilized and evaluate these as needed for the effectiveness of their treatment.

- **Immature Mosquito Sampling-** A set number of fully recoverable dip stations (RDS) may be marked and mapped; other locations may be sampled at any time. Personnel use best professional judgment to determine predicted site impact area and then select the number of dip locations to represent the size of this impact accordingly. Samples may be taken several times per season, preferably after heavy precipitation (rain). The date of the rain event should be recorded when possible. The actual number and location of stations should vary with the size and complexity of the project, and pre-and post- management monitoring should be at the same locations as much as practicable.

- Inspection Schedule  
For purposes of monitoring standards, sites may be sampled in accordance with seasonal flooding or precipitation adequate to support flooding or recharge of the proposed activity area whenever possible.

- 1 Year                              May – August: Following rains or weather events of significant proportion to re-flood the habitat (not to exceed once / month)
- 2 Year                              May – August: Following rains or weather events of significant proportion to re-flood the habitat (not to exceed once / month)

- Number of Recoverable Dip Stations (RDS)

Minimum # RDS	Impact-Acreage	Impact - Linear Feet
5	1 Acre	1-500
10	> 1 Acre	> 500

- Dipping  
The first three dips per dip station are recorded regardless of sample success. Dips are taken from within a 10 foot radius of the mark. A standard to the profession, personnel are issued a white 350 ml “dipper”.

If there is no available water to sample from within a 10 foot radius of the dip location it will be considered dry and recorded by writing “dry” or using a slash mark on the corresponding data sheet. Personnel should not sample any given point more than once. Differentiation is made between larvae and pupae (“L” or “P” or in the case when both are present “L/P”) – and in most cases reference to a particular type of instar should be documented (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, or 4<sup>th</sup>).

### **Additional Post-Monitoring Review Procedure:**

- **Channel/Ditch-** Observe and record the condition of ditch: including but not limited to blockages, erosion or slumping of banks, stability of substrate etc. Observe and record the condition of free flow through the channel / ditch utilizing the following terminology: obstructed, restricted, free flowing or appropriate combination of the above.
- **Vegetation / Regeneration** - Personnel should photograph area of spoil deposition and access / egress routes to evaluate site stabilization, i.e, vegetation recovery. Noticeable changes in vegetation types, new plant species, and reduction or increase of invasive species may be photographed if feasible. MCDs may find use of the invasive species list found in the Massachusetts Inland Wetlands Replication Guidelines helpful:  
<http://www.mass.gov/dep/water/laws/replicat.pdf>
- **Photography-** If practical, photographs should be taken from a variety of fully recoverable and mapped stations during the peak of growing season, (typically August).

The “additional” post monitoring site features above may be evaluated in accordance with the BMP site inspection schedule as follows:

- Inspection Schedule

Within 1 Year	preferably at the peak of first growing season
Within 2 Year	preferably at the peak of second growing season

### **Measures of Project Effectiveness:**

The 9 regional MCDs use the following qualitative and quantitative parameters to monitor, evaluate, and measure the success of the mechanized wetlands management activity to reduce mosquitoes or prevent their future development for a particular project:

- Removal of causes and remedy of conditions contributing to habitat prone to mosquito development (i.e., sediments, blocked culverts, debris in the channel, etc);
- Evidence as recorded in the initial Mosquito Control *Complaint and Documentation Form* (Appendix 1) for comparison from one or more of the following criteria:

- Reduction of mosquito larvae and/ or pupae abundance from field sampling and dip counts within site impact area;
- Reduction of frequency of mosquito larvae and/ or pupae present within site impact area;
- Reduction of larviciding activity within site impact area;
- Reduction or lack of adult mosquitoes in traps or as may be assessed by landing rate counts at the site;
- Reduction of complaints from adjacent residents or public officials; and
- Recorded mosquito control personnel observations including site conditions:
  - Non-conducive to mosquito larval habitat;
  - Conducive to enhancement of predatory fish habitat.

March 24, 2009

# Mechanized Wetland Management: Site Plan Summary Record

Project Identification Name / #: \_\_\_\_\_

Project Location: \_\_\_\_\_

## Project Status *check all that apply*

Accepted  Rejected – Reason \_\_\_\_\_

Pending – Projected Start Date: \_\_\_\_\_ Projected End Date: \_\_\_\_\_  Complete - End Date: \_\_\_\_\_

## Project Purpose- *check all that apply*

Mosquito control  Obstruction removal  Sediment removal  
 Drainage or flood control  Sump Maintenance  Culvert replacement  
 Aquatic Habitat Restoration  Invasive Species Control  Other: \_\_\_\_\_

## Site History – *Maintenance evidence/other records, check all that apply (best professional judgment)*

**Physical:**  Spoil Deposition  Soil Profile  Tree Stumps  Structures Other: \_\_\_\_\_

**Historical:**  Municipal  State  Federal  Mosquito Control Records: \_\_\_\_\_

Recollection:  Residents  Abutters  Fed/Town/State Officials  Mosquito Control: \_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_ Name \_\_\_\_\_ Date \_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_ Name \_\_\_\_\_ Date \_\_\_\_\_

**Mosquito:**  Larvicide  Adulticide  Complaint  MCD Observation / Potential

Comments: \_\_\_\_\_

**Flooding:**  >Annually  Annually  Every 2 Years  5 years  >5 years

## Sensitive Areas – *Site project area checked for occurrence within, check all that apply<sup>1</sup>*

MA NHESP Atlas: 1) Rare & endangered species -  yes  no 2) Certified Vernal pools -  yes  no

MA GIS Map of Outstanding Resource Waters: Outstanding Resource Waters  yes  no

MA DEP Wetlands - Type (if applicable): \_\_\_\_\_

Areas of Critical Environmental Concern  yes  no

## Notification *check all that apply*

Owner/Abutter Date: \_\_\_\_\_  Written  Verbal

Agency Date: \_\_\_\_\_  Local ConCom  MADEP - Office: \_\_\_\_\_  USACE  NHESP

Dig Safe Date: \_\_\_\_\_ Number: \_\_\_\_\_ Clear Date: \_\_\_\_\_

Other: \_\_\_\_\_

## Project Scope *check all that apply*

Mechanized Maintenance Approximate Footage: \_\_\_\_\_

Brushing Approximate Footage: \_\_\_\_\_

Manual Maintenance Approximate Footage: \_\_\_\_\_

Equipment needed: \_\_\_\_\_

## Available Information *check all that apply*

Base Map - Orthophotography  Site Plan  Property Owner and Abutter  USGS Topo Map

Project Evaluation  Photography: Pre  During  Post  Larviciding: Pre  Post

Project Review: 2 Week  6 Month  1 Year  2 Year  Other: \_\_\_\_\_

<sup>1</sup> If any of these sensitive areas occur at the work site, refer to regulatory requirements section of the MA Mosquito Control BMP and Guidance for Freshwater Mosquito Control and indicate location on site work map.

# Mechanized Wetland Management: Site Plan

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Project Identification Name / #: \_\_\_\_\_

## Location

Town(s): \_\_\_\_\_

Road(s): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Approximate start date: \_\_\_\_/\_\_\_\_/\_\_\_\_

## Preparer of Plan

Mosquito Control District: \_\_\_\_\_

Mailing address: \_\_\_\_\_

\_\_\_\_\_

Contact: \_\_\_\_\_

Phone: \_\_\_\_\_

**Site Locus Map** (Submit a copy of the USGS Topographic map with site circled).

# Site Conditions

Project Identification Name / #: \_\_\_\_\_

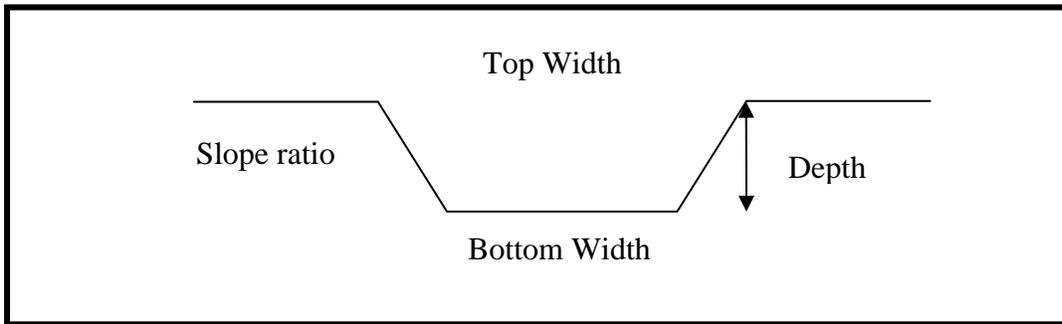
Ditch type \_\_\_\_\_ Total linear feet \_\_\_\_\_ Flow \_\_\_\_\_ Wetland type(s) \_\_\_\_\_

<u>Ditch type:</u>		<u>Flow:</u>		<u>Wetland type:</u>			
M	Main	IT	Intermittent	FO	Forested	EM	Emergent
L	Lateral	PE	Perennial	SH	Shrub	WM	Wet meadow
SL	Sub lateral	OB	Obstructed	OW	Open water		

## Cause and Effect *(check all that apply – best professional judgment)*

- Sedimentation   
  Slumping (banks)   
  Other erosion \_\_\_\_\_   
  Beaver  
 Culvert: Blocked yes  no  \_\_\_%   
  Too Small   
  Too High   
  Headwall damage  
 Stormwater:  Outfalls   
 Withdrawals   
 Floodplain Disconnect   
 Fill or dumping

## Ditch / Channel Profile (representative)



Dimensions (approx. average)	Existing	Proposed
Top width		
Slope ratio		
Depth		
Bottom width		

## Comments:

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**Soils Profile** (representative)

**Project Identification Name / #:** \_\_\_\_\_

Location: \_\_\_\_\_ Organic Depth: \_\_\_\_\_ (inches)

Mineral (if applicable): \_\_\_\_\_ (inches) Other: \_\_\_\_\_ (inches)

Notes: (Types, Colors, Hydrology, etc)

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**Diagram / Map:**

# Erosion Control, Soil Stabilization & Sediment Containment (ESS)

**Project Identification Name / #:** \_\_\_\_\_

Indicate location on Site Plan Map	ESS-1	ESS-2	ESS-3	ESS-4
Straw bales				
Silt fences				
Reseeding				
Mulching				
Straw/Hay bales in water channel				
Water quality swales				
Sediment traps				
Planting				
Other:				

**Comments:**

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**Diagram / Map:**

**Proposed Alteration Summary** *(best professional judgment)*

**Project Identification Name / #:** \_\_\_\_\_

Total Project Length (approx. feet) \_\_\_\_\_ Total Spoil Excavated \_\_\_\_\_ (approx. yards<sup>3</sup>)  
 Mineral: \_\_\_\_\_ (approx. yards<sup>3</sup>) Organic: \_\_\_\_\_ (approx. yards<sup>3</sup>)

Ditch Type	Number	Total Cubic Yards Displaced		
		On Wetland	On Upland	Off Site

Total Cubic Yards Displaced \_\_\_\_\_ On Wetland  
 Total Cubic Yards Displaced \_\_\_\_\_ On Upland  
 Total Cubic Yards Displaced \_\_\_\_\_ Off Site

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Site Plan Map**

Attach a copy of the Site Plan Map (i.e. aerial photograph or MassGIS if available) depicting the site location and proposed work with the Standard Notification Form to the appropriate Department. The Site Plan Map / photo should include the following information marked on it at a minimum: equipment access points (name nearby streets), approximate locations of all work areas, locations of erosion control (ESS) measures implemented (from previous section above), and locations of dredge spoil deposits.

# **Mechanized Wetland Management: Recoverable Station Record**

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Project Identification Name / #: \_\_\_\_\_

Project Location: \_\_\_\_\_

## **Immature Mosquito**

Recoverable Dip Station (RDS) - File Name: \_\_\_\_\_

<b>RDS #<sup>1</sup></b>	<b>GPS Coordinates</b>		<b>RDS Description</b>
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

## **Photography**

Recoverable Photo Station (RPS) - File Name: \_\_\_\_\_

<b>RPS #</b>	<b>GPS Coordinates</b>		<b>RPS Description</b>
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

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<sup>1</sup> 5 RDS for site areas up to 1 Acre or 500 linear feet and 10 RDS for sites > 1 Acre or > 500 linear feet.

# **Mechanized Wetland Management: Mosquito Complaint Record**

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Project Identification Name / #: \_\_\_\_\_

Project Location: \_\_\_\_\_

- Larviciding Records
- Adulciding Records
- Complaint

- Mapped Larviciding Site
- Dipper Data
- Other: \_\_\_\_\_

## **Field Personnel's Observation**

- Larvae or Adult Mosquitoes Observed at Site
- Dipper Data (see attached sheets)

Name

Date

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Comments

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## **Resident's Complaints**

Name

Date

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## **Public Official's Complaints**

Name

Date

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# Mechanized Wetland Management: Immature Mosquito Record

Project Identification Name/#: \_\_\_\_\_ Sampling Date: \_\_\_\_\_  
 Mean Immature Mosquito / Site: \_\_\_\_\_<sup>1</sup> Previous Rain Date: \_\_\_\_\_

## Dip Station #1

Dip #	#	Instar (if available)				
		1	2	3	4	P
1						
2						
3						

Mean / station: \_\_\_\_\_  
 Notes: \_\_\_\_\_

## Dip Station #2

Dip #	#	Instar (if available)				
		1	2	3	4	P
1						
2						
3						

Mean / station: \_\_\_\_\_  
 Notes: \_\_\_\_\_

## Dip Station #3

Dip #	#	Instar (if available)				
		1	2	3	4	P
1						
2						
3						

Mean / station: \_\_\_\_\_  
 Notes: \_\_\_\_\_

## Dip Station #4

Dip #	#	Instar (if available)				
		1	2	3	4	P
1						
2						
3						

Mean / station: \_\_\_\_\_  
 Notes: \_\_\_\_\_

## Dip Station #5

Dip #	#	Instar (if available)				
		1	2	3	4	P
1						
2						
3						

Mean / station: \_\_\_\_\_  
 Notes: \_\_\_\_\_

## Dip Station #6

Dip #	#	Instar (if available)				
		1	2	3	4	P
1						
2						
3						

Mean / station: \_\_\_\_\_  
 Notes: \_\_\_\_\_

## Dip Station #7

Dip #	#	Instar (if available)				
		1	2	3	4	P
1						
2						
3						

Mean / station: \_\_\_\_\_  
 Notes: \_\_\_\_\_

## Dip Station #8

Dip #	#	Instar (if available)				
		1	2	3	4	P
1						
2						
3						

Mean / station: \_\_\_\_\_  
 Notes: \_\_\_\_\_

## Dip Station #9

Dip #	#	Instar (if available)				
		1	2	3	4	P
1						
2						
3						

Mean / station: \_\_\_\_\_  
 Notes: \_\_\_\_\_

## Dip Station #10

Dip #	#	Instar (if available)				
		1	2	3	4	P
1						
2						
3						

Mean / station: \_\_\_\_\_  
 Notes: \_\_\_\_\_

<sup>1</sup> Total # mosquito / Total # all dips = Mean / Site  
 Total # mosquito / # dips / station = Mean / Station

# Mechanized Wetland Management: Post Monitoring Summary Record

Project Identification Name / #: \_\_\_\_\_

Project Location: \_\_\_\_\_

(Recommended review sampling per review period is highlighted in bold text).

**Post Excavation Review** (2 Weeks - check all that apply)

Date: \_\_/\_\_/\_\_

Cause and Effect     Erosion Control Structure     Mosquito Sampling (May – August)

Channel/Ditch     Vegetation     Photography     Other \_\_\_\_\_

Work needed:  yes  no      Site Stable:  yes  no

Comments: \_\_\_\_\_

\_\_\_\_\_

**Post Review: Rain Event** (up to 6 Months - check all that apply)

Date: \_\_/\_\_/\_\_

Cause and Effect     Erosion Control Structure     Mosquito Sampling (May – August)

Channel/Ditch     Vegetation     Photography     Other \_\_\_\_\_

Work needed:  yes  no      Site Stable:  yes  no

Comments: \_\_\_\_\_

\_\_\_\_\_

**Post Review: Rain Event** (up to 6 Months - check all that apply)

Date: \_\_/\_\_/\_\_

Cause and Effect     Erosion Control Structure     Mosquito Sampling (May – August)

Channel/Ditch     Vegetation     Photography     Other \_\_\_\_\_

Work needed:  yes  no      Site Stable:  yes  no

Comments: \_\_\_\_\_

\_\_\_\_\_

**Post Review: Rain Event** (up to 6 Months - check all that apply)

Date: \_\_/\_\_/\_\_

Cause and Effect     Erosion Control Structure     Mosquito Sampling (May – August)

Channel/Ditch     Vegetation     Photography     Other \_\_\_\_\_

Work needed:  yes  no      Site Stable:  yes  no

Comments: \_\_\_\_\_

\_\_\_\_\_

**Post Review: Rain Event** (up to 6 Months - check all that apply)

Date: \_\_/\_\_/\_\_

Cause and Effect     Erosion Control Structure     Mosquito Sampling (May – August)

Channel/Ditch     Vegetation     Photography     Other \_\_\_\_\_

Work needed:  yes  no      Site Stable:  yes  no

Comments: \_\_\_\_\_

\_\_\_\_\_

**Post Review: 1 Year** (after first growing season - check all that apply)

Date: \_\_/\_\_/\_\_

Cause and Effect     Erosion Control Structure     Mosquito Sampling (May – August)

Channel/Ditch     Vegetation     Photography     Other \_\_\_\_\_

Work needed:  yes  no      Site Stable:  yes  no

Comments: \_\_\_\_\_

\_\_\_\_\_

**Post Review: 2 Year** (after second growing season - check all that apply)

Date: \_\_/\_\_/\_\_

Cause and Effect     Erosion Control Structure     Mosquito Sampling (May – August)

Channel/Ditch     Vegetation     Photography     Other \_\_\_\_\_

Work needed:  yes  no      Site Stable:  yes  no

Comments: \_\_\_\_\_

\_\_\_\_\_

# Mechanized Wetland Management: Post Monitoring Record

**Project Identification Name / #:** \_\_\_\_\_ **Project Review Date:** \_\_\_/\_\_\_/\_\_\_  
**Project Reviewer:** \_\_\_\_\_ **Project Completion Date:** \_\_\_/\_\_\_/\_\_\_

## Post Monitoring Review Period

2 Week  < 6 months / Rain Event: Date of Rain \_\_\_/\_\_\_/\_\_\_  1 Year  2 Year  Other \_\_\_\_\_

## Cause and Effect (check all that apply – best professional judgment)

Sedimentation  Slumping (banks)  Other erosion \_\_\_\_\_  Beaver  
 Culvert: Blocked yes  no  \_\_\_%  Too Small  Channel below invert  Headwall damage  
 Stormwater:  Outfalls  Withdrawals  Disconnected floodplain  Fill or dumping

Comments: \_\_\_\_\_  
\_\_\_\_\_

## Erosion Control Structures (check all that apply: yes = okay / no = needs work)

Silt fencing: yes  no   Straw bales: yes  no   Check dams: yes  no   
 Fabric: yes  no   Swales: yes  no   Vegetated buffer: yes  no   
 Seed crop: yes  no   Plantings: yes  no   Armor: yes  no   
 Mulch: yes  no   Site Stable: yes  no   Additional Measures: yes  no

Comments: \_\_\_\_\_  
\_\_\_\_\_

## Mosquito Sampling (May – August: see Mosquito Sampling Record attached)

Recoverable Dip Stations (File name): \_\_\_\_\_  Other (File name): \_\_\_\_\_  
Larval Species: \_\_\_\_\_ Adult Species: \_\_\_\_\_ Landing Rate: \_\_\_ / minute  
Mean Immature Mosquito: (Total Live Immature Mosquito / # of Wet Dips) \_\_\_\_\_ / \_\_\_\_\_ Dips

Comments: \_\_\_\_\_  
\_\_\_\_\_

## Channel / Ditch (Check all that apply)

Obstructed  Restricted  Free-flowing  Comments: \_\_\_\_\_  
Bankings: Stable  Not Stable  Substrate: Stable  Not Stable   
Work needed:  yes  no  Work performed: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_

## Vegetation - Regeneration (check all that apply: yes = okay / no = needs work)

Access/Egress: yes  no   Spoil Deposition: yes  no   Stockpile Areas: yes  no   
 Seeded Areas: yes  no  Scarring: yes  no  Location: \_\_\_\_\_  
Work needed: \_\_\_\_\_  
 Invasive Species: yes  no  Types: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_

## Photography

Recoverable Photo Stations (File name): \_\_\_\_\_  Other (File name) \_\_\_\_\_

## Comments:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_