Protocol to use the WQFAM Version 5.1 Data Sheet

The needed equipment for the use of the WQFAM data sheets is

1) a clean bucket or Nalgene bottle on a reach pole or cord depending on the filter marsh location.
2) a clear plastic or glass container of 5 to 6.3 cm (2 to 2.5 inch) diameter, preferable with a screw-on top.
3) the *Water Quality Functional Assessment Method for Filter Marshes Plant Identification Guide* may be used to answer several of the plant questions.

PART 1: Water Clarity

Step 1: Select a site in the filter marsh that is a treatment cell with marsh vegetation. Do not locate the assessment site at or near an in-fall, or any out-fall location. Do not select a deep water settling cell, canal or channel. Collect water with bucket or Nalgren bottle and put water into clear container.

Figure 1: A-Team member gathering a water sample for step 2 at Ten Mile Canal filter marsh.

Step 2: Look through container at data sheet. Score the Container Visual Review by looking through the container at the printed side of the data sheet).

Can't see through the container = 1
Can see through container, but can't read text on datasheet = 4
Can see through container, and can read text on datasheet = 6
Pretty clear, but not as clear as bottled water = 8
As clear as bottled water = 10

Write number on line **Container Visual Review score** = _____

It is acceptable to select other integer numbers for conditions between the stated written line conditions.

Figure 2: Scientist-Intern performing Step 2 at 10-Mile Canal Filter Marsh South End.

Step 3: Looking through the container with water, observe for the visual indicators: Floating Solids, Suspended Solids, Oil/Fuel Sheen, Foam and Dead Aquatic Life. Mark if present or not present and describe the issue if it is present.

Figure 3: Author looking for visual indicators in Step 3.

PART 2: Algae

Step 4: Looking at all the algae present determine by visual inspection to what extent the algal community composition is not characterized by species tolerant of and associated with water quality degradation. Species of algae tolerant of and associated with water quality degradation are typically filamentous green algae, blue-green algae, and blooming algal phytoplankton.

Below are some visual examples:

Figure 4: Filamentous Green Algae.

Figure 5: Filamentous Green Algae.

Figure 6: Blue-Green Algae.

Figure 7: Blue-Green Algae.

Figure 8: Blue-Green Algae.

So if the Algal community is not filamentous green algae, blue green algae and/or phytoplankton blooms than it would score high (10). If the algal community is all or only filamentous green algae, blue green algae and/or phytoplankton blooms than it would score low (0).

Step 5: Algal Biomass
Looking at all the algae present determine by visual inspection how much algal biomass there is in the assessment area. This includes all submerged benthic, water column, and surface floating algae of all species.

If there is no visible algae then the score is 10. If the only visible plant biomass is algae then this is excessive at 100% and the score is 0. Below is a guide for visual estimation of algal biomass for a visual inspection.

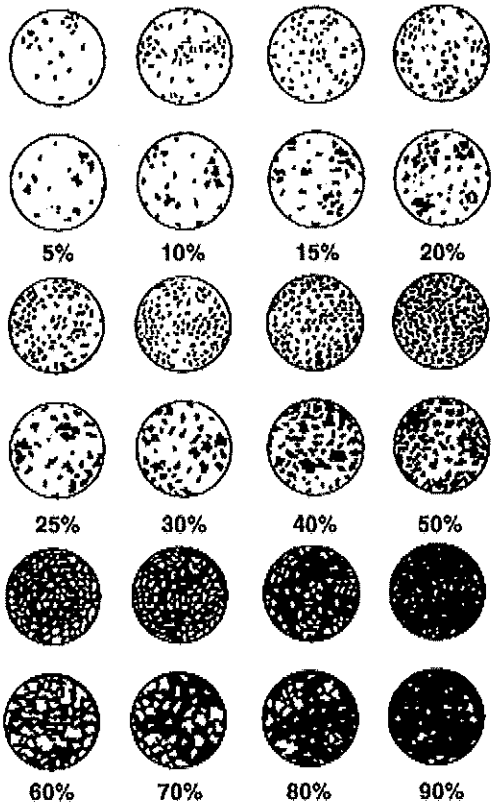

Figure 9: % Biomass Visual Estimator.

Step 6: Blue-Green Algae and Filamentous Green Algae
Looking at all the algae present determine by visual inspection in the assessment area how much of the algal is blue-green algae and/or filamentous green algae. Examples of these species are shown above.

Step 7: Algal Cover

Looking at all the algae present determine by visual inspection if the algal cover is characteristic in the assessment area for that wetland type. The wetland type of filter marshes is herbaceous freshwater or brackish water wetland unless the filter is a floating island in which case it is lake littoral. The characteristic algaes of freshwater marshes include periphyton, diatoms, green algaes, and golden algaes. Below is a guide for visual estimation of algal cover from a visual inspection based on estimation of cover associated with oil spills.

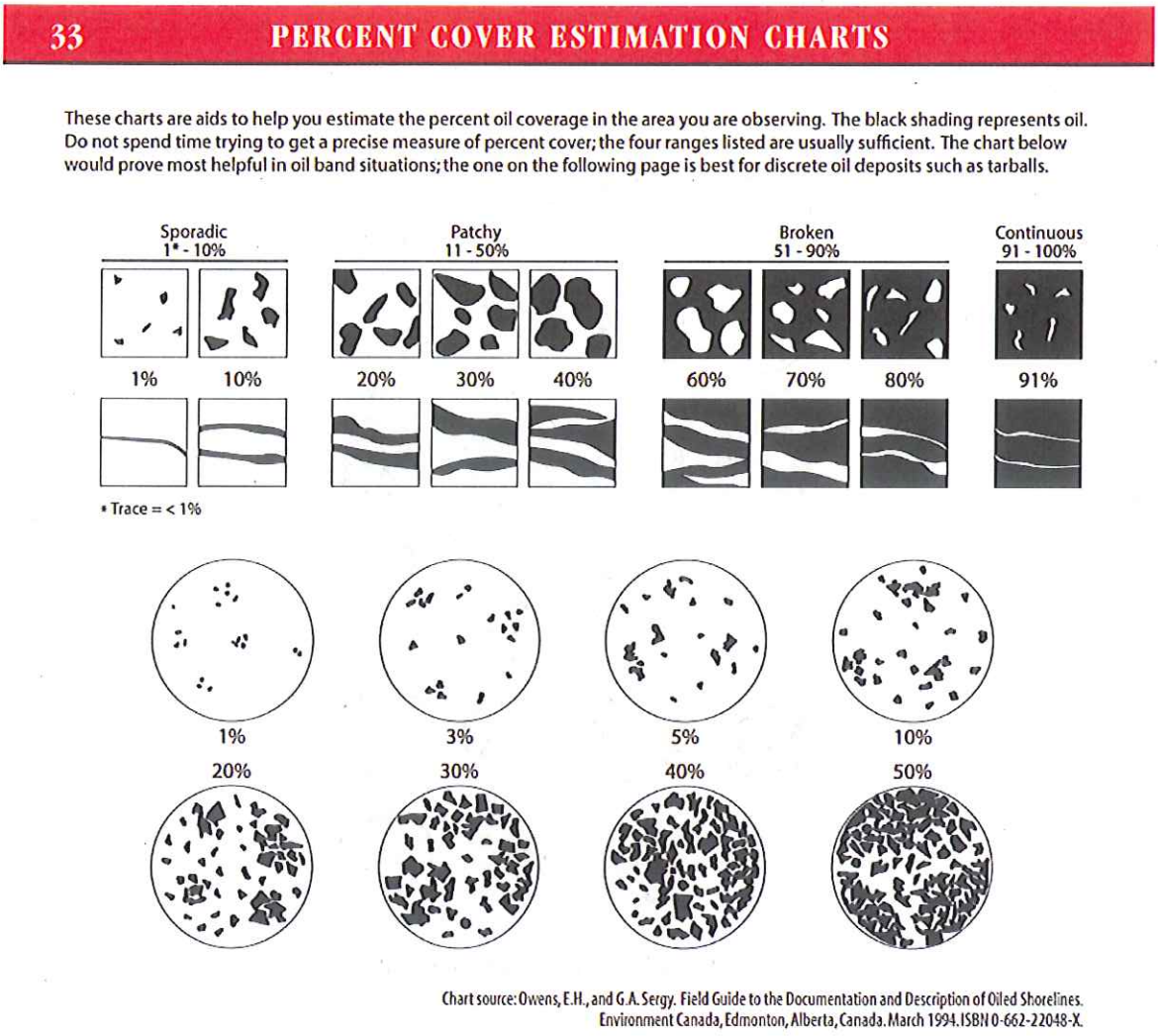

Figure 10: % visual cover estimation charts

PART 3: Vascular Plant Species and Condition

Step 8: Undesirable Species
Looking at all the vascular plants present determine by visual inspection in the assessment area what undesirable vascular plant speceis are present. The list is on the data sheet and all these species can be found in the *Water Quality Functional Assessment Method for Filter Marshes Plant Identification Guide.*

Step 9: Vascular Plants Observed
Looking at all the vascular plants present determine by visual inspection in the assessment area what other vascular plant species are present. All the species encountered in the course of the project in filter marshes of southwest Florida can be found in the Water Quality Functional Assessment Method for Filter Marshes Plant Identification Guide. Write the names of the species in the blank space provided. The names can be the common name, the scientific name or both.

Figure 11: A-Team members perform a visual inspection of vascular plant species at Ten Mile canal for Step 9.

Step 10: Vascular Plant Community

Looking at all the vascular plants present determine by visual inspection in the assessment area if the plant community is characterized by plant species tolerant of and associated with water quality degradation. These species include several of the undesirable species including cattails, Peruvian primrose willow, water hyacinth, water lettuce, duckweed, and West Indian marsh grass. Do not consider the algae here. That was done in a prior observation. If plant species tolerant of and associated with water quality degradation are not present or in a small amount then this will score a 10. If the vascular plant community is dominated by these species than the score will be zero (0).

Figure 12: An example of a filter marsh plant community composition that is not characterized by species tolerant of and associated with water quality degradation scoring a 10.

Figure 13: An example of a filter marsh plant community composition consists predominantly of species tolerant of and associated with highly degraded water scoring a 0.

Step 11: Vascular Plant Community Zonation

Looking at all the vascular plants present determine by visual inspection in the assessment area if the zonation of vegetation is appropriate in a normal condition. In a linear filter marsh a series of parallel bands of vegetation with decreasing tolerance of inundation as the vegetation extends landward and upgrade. In circular or irregular filter marsh vegetated cells, the bands will circle the perimeter with decreasing tolerance of inundation landward and up slope. Open water settlement cells will not be expected to display zonation but these settling cells should not be an assessment site for WQFAM. If zonation is absent of out of order in a filter marsh vegetation cell then there is likely grading problems or an unusual monoculture, likely of a nuisance species. Cells with algae blooms will also lack appropriate zonation.

Figure 14: A-Team visually examining zonation at 10-mile Canal filter marsh.

Figure 15: Example of a filter marsh showing a score of 10 in plant zonation.

Figure 16: Example of a filter marsh showing a core of 7 in plant zonation.

Figure 17: Example of a filter marsh showing a score of 0 in plant zonation.

Step 12: Vascular Plant Cover

Looking at all the vascular plants present determine by visual inspection in the assessment area if the plant cover is characteristic for that wetland type. The wetland type for filter marshes is either depressional herbaceous for a bermed cell with a water control outflow or riverine herbaceous for linear free-flowing systems. The vascular plants characteristic of filter marsh should be native, obligate and facultative wetland grasses, sedges, rushes, reeds, and herbaceous monocots and dicots. Exotic invasive species, upland native plants, and (unless they were part of project design) trees and shrubs are not characteristic plant species for successful filter marshes.

Figure 18: A-Team estimating the vascular plant cover.

Step 13: Calculate Scores for Categories

- **Container visual review score = Water Clarity score = _____**
- **(Algal community composition score +Algal biomass score + Blue-green/ Filamentous Green Algae score +Algal cover score)/3 = Algae score = _____**
- **(Plant community composition score + Plant Community Zonation score + Plant cover score)/3 = Plant Score = _____**

For example on a site visit to Powell Creek Filter Marsh the Container visual review score was 8; the Algal community composition score was 7, the Algal biomass score was 5, the Blue-green/ Filamentous Green Algae score was 10, and the Algal cover score was 6, the Plant community

composition score was 10, the Plant Community Zonation score was 8, and the Plant cover score was 10.

- **Container visual review score = Water Clarity score = 8**
- **(Algal community composition score +Algal biomass score + Blue-green/ Filamentous Green Algae score +Algal cover score)/3 = Algae score = 7**
- **(Plant community composition score + Plant Community Zonation score + Plant cover score)/3 = Plant Score = 9.3**

Step 14: Final WQFAM Score

- **WQFAM score = (Water Clarity score +Algae score + Plant score)/ 3 = _____**

From the example on a site visit to Powell Creek Filter Marsh

- **WQFAM score = (Water Clarity score +Algae score + Plant score)/ 3 = 8.1**

WQFAM 5.1 DATA SHEET
Part 1 Water Clarity

Site/Project Name	Site/Project ID	Conducted by Date

Container Visual Review (look through the container)

Can't see through the container = 1
Can see through container, but can't read text on datasheet = 4
Can see through container, and can read text on datasheet = 6
Pretty clear, but not as clear as bottled water = 8
As clear as bottled water = 10

Container visual review score = _____

Visual Indicators

Floating Solids	Yes / No	Describe
Suspended Solids	Yes / No	Describe
Oil / Fuel Sheen	Yes / No	Color and amount
Foam	Yes / No	Describe thickness, color, how much surface it covers
Dead Aquatic Life	Yes / No	Describe

WQFAM 5.1 DATA SHEET
Part 2 Algae

Site/Project Name	Site/Project ID	Conducted by Date

Algal Community - Circle score or check box

	Score
Algal community composition is not characterized by species tolerant of and associated with water quality degradation.	10
Some of the algal community composition consists of species tolerant of and associated with moderate water quality degradation.	7
Half of the algal community composition consists of species tolerant of and associated with moderate water quality degradation.	5
Much of the algal community composition consists of species tolerant of and associated with moderate water quality degradation.	3
The algal community composition consists predominantly of species tolerant of and associated with highly degraded water	0

Algal community composition score=

Algal Biomass

Algal biomass low 0%	10
	7
Algal biomass moderate 50%	5
	3
Algal biomass excessive 100%	0

Algal biomass score =

Blue-Green or Filamentous Green Algae

No blue-green or filamentous green algae	10
Approximately 30% blue-green or filamentous green algae	7
Approximately 50% blue-green or filamentous green algae	5
Approximately 70% blue-green or filamentous green algae	3
Blue-green or filamentous green algae monoculture	0

Blue-green algae score =

Algal Cover

Algal cover characteristic for that wetland type	10
Most of the algal cover characteristic for that wetland type	7
Half of the algal cover characteristic for that wetland type	5
Some of the algal cover characteristic for that wetland type	3
Algal cover completely uncharacteristic for that wetland type	0

Algal cover score =

WQFAM 5.1 DATA SHEET
Part 3 Vascular Plant Species and Condition

Site/Project Name	Site/Project ID	Conducted by Date

Examples of Undesirable Species (circle)

Common Name	*Genus*	*Species*
air potato	*Dioscorea*	*bulbiflora*
alligator weed	*Alternantera*	*philoxeroides*
Australian pine	*Casuarina*	*equisetifolia*
bahia grass	*Paspalum*	*notatum*
Brazilian pepper	*Schinus*	*terebinthifolius*
Caesar weed	*Urena*	*lobata*
carrotwood	*Cupaniopsis*	*esculenta*
cattail	*Typha*	spp.
Chinese tallow	*Sapium*	*secunotatum*
climbing cassia	*Senna*	*pendula*
climbing hempweed	*Mikania*	*scandens*
downy rose myrtle	*Rhodomyrtus*	*tomentosa*
guava	*Psidium*	*guajava*
hydrilla	*Hydrilla*	*verticillata*
Japanese climbing fern	*Lygodium*	*japonicum*
Java plum	*Syzygium*	*cumini*
melaleuca	*Melaeuca*	*quinquenervia*
old world climbing fern	*Lygodium*	*microphyllum*
para grass	*Brachiaria*	*mutica*
primrose willow	*Ludwigia*	*peruviana*
seaside mahoe	*Tespesia*	*populnea*
shoebutton ardisia	*Ardisia*	*elliptica*
taro	*Colocasia*	*esculenta*
torpedo grass	*Panicum*	*repens*
water hyacinth	*Eichornia*	*crassipes*
water lettuce	*Pistia*	*stratiotes*
water primrose	*Ludwigia*	*octovalvis*
wedelia	*Wedelia*	*trilobata*
West Indian marsh grass	*Hymenachne*	*amplexicaulis*

Vascular Plants Observed

Vascular Plant Community

	Score
Plant community composition is not characterized by species tolerant of and associated with water quality degradation.	10
Some of the plant community composition consists of species tolerant of and associated with moderate water quality degradation.	7
Half of the plant community composition consists of species tolerant of and associated with moderate water quality degradation.	5
Much of the plant community composition consists of species tolerant of and associated with moderate water quality degradation.	3
The plant community composition consists predominantly of species tolerant of and associated with highly degraded water	0

Plant community composition =

Vascular Plant Community Zonation

Zonation of vegetation appropriate	10
	7
	5
	3
Zonation of vegetation inappropriate	0

Plant community zonation score =

Vascular Plant Cover

Plant cover characteristic for that wetland type	10
Most of the plant cover characteristic for that wetland type	7
Half of the plant cover characteristic for that wetland type	5
Some of the plant cover characteristic for that wetland type	3
Plant cover completely uncharacteristic for that wetland type	0

Plant cover score =

Notes:

WQFAM Score is

Container visual review score = Water Clarity score = _____

(Algal community composition score +Algal biomass score + Blue-green/ Filamentous Green Algae score +Algal cover score)/3 = Algae score= _____

(Plant community composition score + Plant Community Zonation score + Plant cover score)/3 = Plant Score= _____

WQFAM score = (Water Clarity score +Algae score + Plant score)/ 3 = _____