CHAPTER V

CONCLUSION AND RECOMMENDATION

CONCLUSION

Based on the experimental results obtained, the following conclusions can be drawn.

1. Eleocharis dulcis height at 0.45 m water depth was heigher than Eleocharis dulcis at other water depths. Cyperus corymbosus height was no significant difference among three water depths.

2. Constructed wetland systems with plant were consistently better than no plant system for pollutants removal.

3. BOD removal

Plant types and water depth have significantly effected against the efficiency for BOD removal. Cyperus corymbosus is the best system, especially at 0.15 m wastewater depth which compared in plant groups and depths. In contrast, when compared all data , Cyperus corymbosus at 0.45 m water depth is the best for BOD removal, but there is no significant difference between 0.15 m and 0.45 m water depth. Their efficiency for BOD removal closed to 60 %, however.

4. Orthophosphate phorus removal

Cyperus corymbosus has the best efficiency for PO_4^{3-} removal, and at 0.15 m water depth, its efficiency will be increased. Comparing to all data, Cyperus corymbosus at 0.30 m water depth is the best, on the contrary, there is no significant difference for PO_4^{3-} removal between 0.15 m and 0.30 m water depth. Their efficiency are over 90 %.

5. NH_3-N removal

Water depth has no effected significantly against the efficiency for NH_3-N removal, even though plant groups has effected against it, significantly. Cyperus corymbosus is the best performance. In consideration of all data, Eleocharis dulcis

at 0.30 m water depth is the best. In addition, there is no significant difference between Cyperus corymbosus at 0.15 m water depth and Eleocharis dulcis at 0.30 m, although their efficiency are over 80 %.

6. TKN removal

Plant types and water depth have effected against the efficiency for TKN removal, significantly. Cyperus corymbosus is the best. At 0.30 m water depth is the best, but there is no significant difference between 0.30 m and 0.15 m water depth. Comparing to these data, Cyperus corymbosus at 0.15 m water depth is the best performance for TKN removal and its efficiency is over 60 %.

7. TSS removal

Plant types has effected against the efficiency for TSS removal,significantly, but water depth has not. Cyperus corymbosus is the best performance for TSS removal, especially at 0.30 m water depth and its efficiency is over 70 %.

8. TDS removal

Plant types and water depth have effected against the efficiency for TDS removal, significantly. Nevertheless, Cyperus corymbosus is still better than Eleocharis dulcis and no plant.

9. Cyperus corymbosus is the suitable plant for removal all parameters at 0.15 m wastewater depth.

PROBLEMS AND OBSTRUCTIONS

During the study, there have been some problems and obstructions that may cause some errors. These errors may be because the systems were operated during rainy season which wastewater could be interfered or diluted from rain. Including, the climate at site study were always vary or differ during the day. So, sunlight and wind had effected on system work. Morever, the true municipal wastewaters were fed every day, which made the difference of influent wastewater quality. All of them were out of controlled factors, in addition there were some personal errors. Thus some errors in these studies could be anticipated.

Table 5.1 Selection of suitable species in three wastewater depths and suitable depth with each species for pollutants removal.

Parameters	Plant & Depth interaction		Suitable plant for 3 wastewater depths			Suitable depth for 3 plant group		
	F.Ratio	F.Prob	F.Ratio	F.Prob	Suitable species	F.Ratio	F.Prob	Suitable depth
BOD	16.6370	0.0000	5.2171	0.0065	3, 2	17.7681	0.0000	0.15, 0.45
Ortho-P	14.5850	0.0000	17.5098	0.0000	3	17.4021	0.0000	0.15, 0.30
TKN	2.7400	0.0310	21.9076	0.0000	3, 2	3.4726	0.3360	0.45, 0.15
NH3-N	3.4440	0.0100	16.6134	0.0000	3, 2	0.5970	0.5518	0.15, 0.30, 0.45
TSS	3.4630	0.0100	3.9863	0.0207	3, 1	2.3150	0.1025	0.15, 0.30, 0.45
TDS	2.0260	0.0940	1.872	0.1576	1, 2, 3	1.6579	0.1942	0.15, 0.30, 0.45

Note: specie 1 = No plant
specie 2 = Eleocharis dulcis
specie 3 = Cyperus corymbosus

RECOMMENDATION

From this study, several recommendation for further study are given as follows :

1. Other local plant types such as Pharagmites spp., Typha spp., and Canna spp. should be studied to find their treatment wastewater capacity.

2. Combination between two plant types or over two plant types should be studied . The combination may obtain better treatment efficiency due to thier ability for nutrients or pollutant removal.

3. Wastewater from other important sources should be studied in the FWS system to find the better way for treatment wastewater.

4. Experiment should be take more long time and data sampling should be collected follow season time or avoid to take experiment in rainny season.

5. Further studies are required to evaluate the treatment characteristics and practical utility of hydraulic loading stregies (e.g.batch, continuous, intermittent) for FWS wetlands.