

Aquatic Vegetation Management Plan for Lake Hood and Lake Spenard



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Aquatic Vegetation



– There are Four Categories of Aquatic Vegetation

- Emergent (bulrush)
- Free-floating (duckweed)
- Rooted with floating leaves (water lilies)
- Submersed (milfoil)

– Most Common Species Found in Lakes Hood and Spenard

- Spikerush – Erosion control
- Bulrush – Erosion control
- Pondweed – Problematic for floatplanes
- Milfoil – Problematic for floatplanes



Why is Aquatic Vegetation Problematic?

- Vegetation can get caught on the rudders and floats of planes
- Could affect floatplane operations
- Plant debris accumulates around slip docks
- Could limit aesthetic appeal at public beach
- Bad odor could be a nuisance for slip owners and recreational users

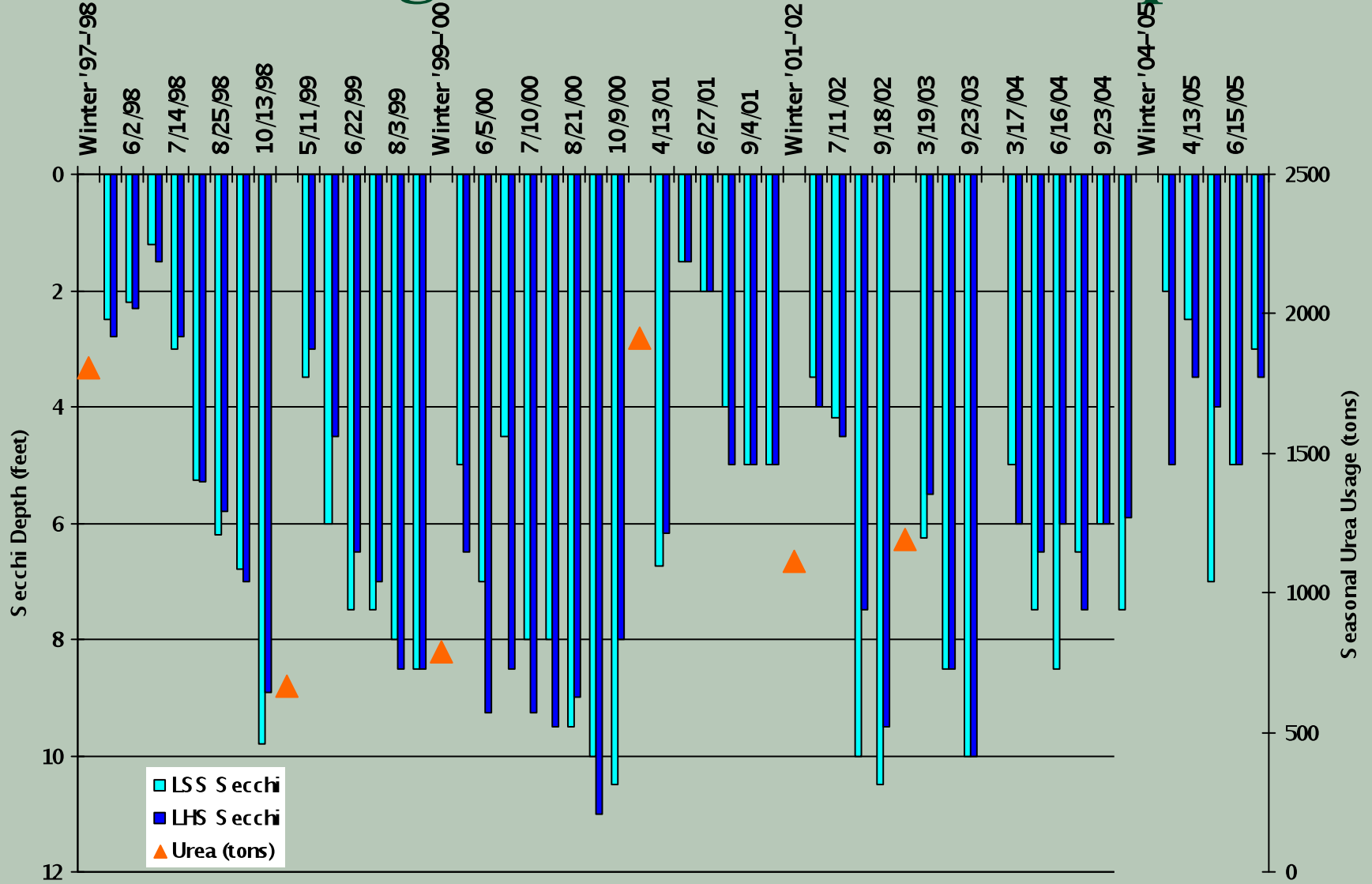


Aquatic Vegetation in Lakes Hood and Spenard

- Water clarity has been improving over the past few years due to storm water pollution prevention measures (diversions, GRVs, potassium acetate)
- Specifically:
 - Urea loading may relate directly or indirectly to water clarity
 - More light can penetrate through clearer water, which usually results in increased aquatic vegetation growth



Urea Usage vs. Secchi Disk Depth



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ANC's Approach

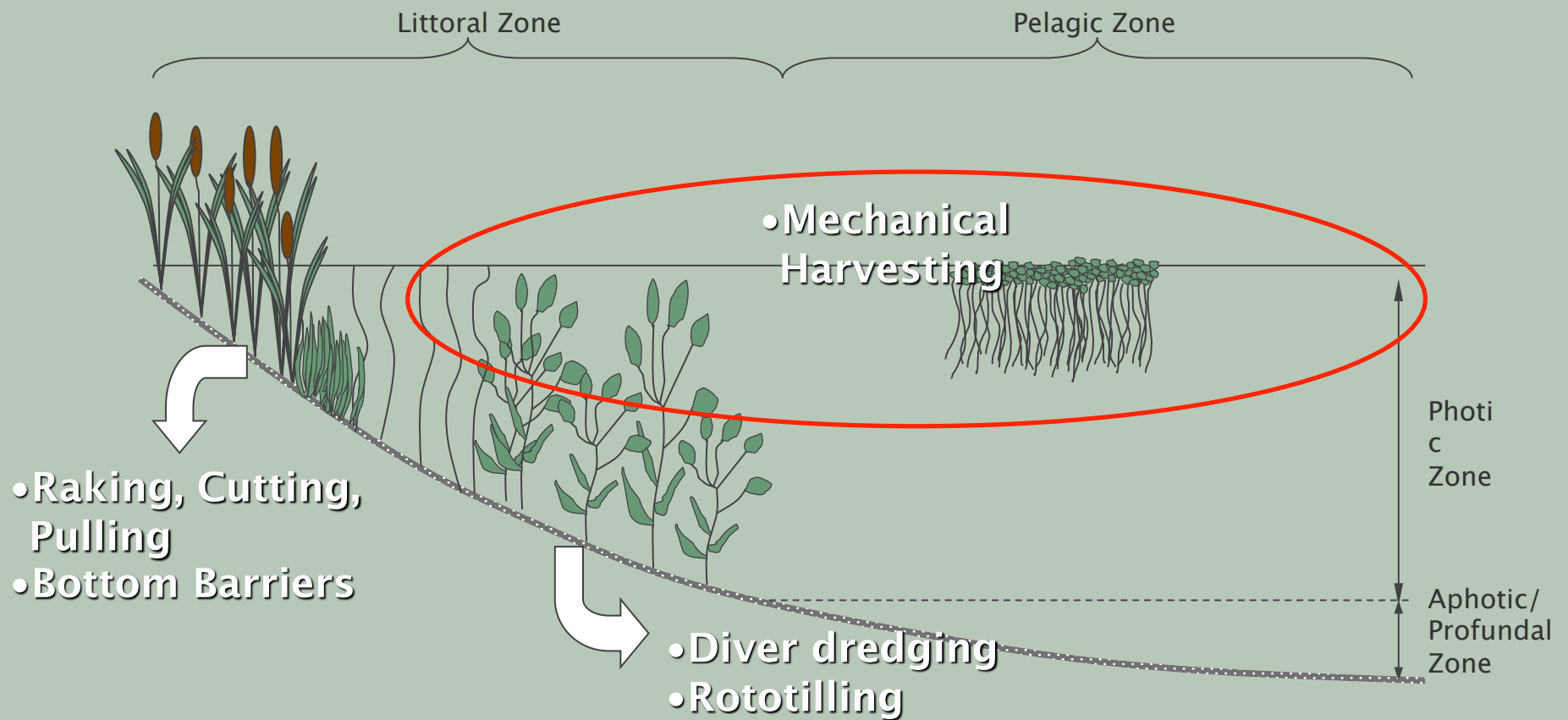
- *Proactive* approach toward controlling aquatic vegetation
- Consider all management options:
 - Physical/Mechanical
 - Biological
 - Chemical
- Determine most appropriate method(s) with regard to effectiveness, environmental considerations, and cost
- Implement Plan for 5-years, then assess and adjust as necessary

Physical/Mechanical Techniques



- **Hand Pulling, Raking, or Cutting**
 - Manually pull, rake, or cut down plants
- **Mechanical Harvesters**
 - Large machine cuts and harvests vegetation
 - ANC can either purchase harvester, borrow Homer's EH-220 Harvester, or outsource harvesting to local contractor
- **Bottom Barriers**
 - Large tarp placed on bottom, which blocks sunlight and prevents growth
- **Diver dredging, rotenone, and water level drawdown**

Where do the Physical Methods Work?



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Many Physical Methods were Eliminated from Consideration

- Bottom barriers eliminated due to cost and potential for becoming dislodged
- Water level drawdown not realistic – Lakes need stable water level for floatplane operation
- Rotovation and diver dredging substantially increase water column turbidity and could reduce water quality.

Biological Control Techniques

Biological control is the intentional release of an organism to limit growth of nuisance vegetation

– Carp

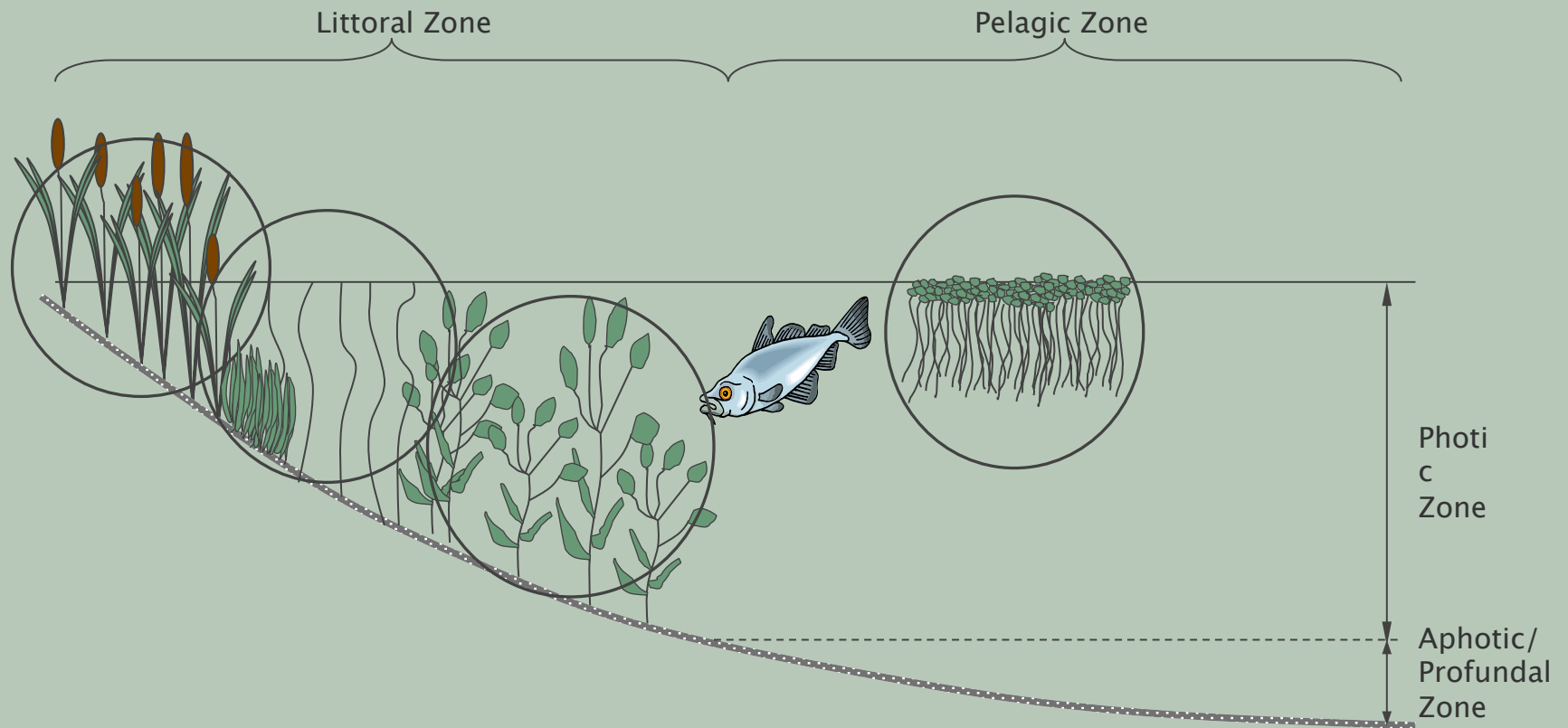
- Non-reproducing fish that feed on aquatic vegetation initial low cost, may denude lake or have little effect



– Insects

- Weevils feed and burrow into stems of northern milfoil

Where do Biological Methods Work?



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Biological Controls Were Eliminated as Options

- **Triploid Carp**

- Many uncertainties, they can completely denude lake or they can barely make a dent
- Survival in Lakes Hood & Spenard uncertain
- Never permitted in Alaska
- Difficult to permit in Alaska – called “a most challenging endeavor” by ADFG biologist

- **Insects**

- Survival in Lakes Hood & Spenard uncertain Never permitted in Alaska
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Chemical Control Techniques

Chemical control can be used to kill plant tissue or adversely affect their growth process

– Herbicides

- Herbicides retard or eliminate plant growth
- Will require a DEC permit
- Public may not approve
- Are not toxic to fish or wildlife when used properly
- Dead and decaying plants must be removed to prevent nutrients being released and lowering DO

– Dye

- Reduces light penetration in water thereby limiting plant growth, may be aesthetically unappealing

Aquatic Herbicide Characteristics

Herbicide	Description	Nuisance Species		Beneficial Species		Approximate Cost per Acre
		Pondweed	Milfoil	Spikerush	Bulrush	
2,4-D (Navigate)	Selective, effective for whole-lake or spot treatments. Half life: 10-50 days.	X	X			\$500
Diquat (Reward)	Contact, nonselective, binds to sediment and is very persistent, but its half life in water column is 1-7 days.	X	X	X	X	\$300
Endothall (Hydrothol)	Water soluble, contact, best for submersed weeds. Half life: 4-7 days.	X	X			\$500 to \$800
Fluridone (Sonar)	Selective, works well for whole-lake treatments, and should not be used in areas <10 acres. Half life: 20-90 days	X	X			\$100 to 700
Glyphosate (Rodeo)	Broad spectrum herbicide that is used to control immersed vegetation.			X		\$250
Triclopyr	Selective, low toxicity herbicide that is most effective for spot treatment		X			\$600

Vegetation Management Scenarios

3 Scenarios were devised with varying levels of control and effort by ANC

- 1) ANC would perform all aquatic vegetation management
- 2) Slip owners responsible for their own slips, while ANC would maintain open water
- 3) ANC would not maintain any responsibility for vegetation control, which would be left entirely to slip owners

Scenario 1 – ANC Does Everything

ANC	2005												2006												2007												2008												2009												5-year Present Worth Costs
	j	f	m	a	m	j	j	a	s	o	n	d	j	f	m	a	m	j	j	a	s	o	n	d	j	f	m	a	m	j	j	a	s	o	n	d	j	f	m	a	m	j	j	a	s	o	n	d	j	f	m	a	m	j	j	a	s	o	n	d	
Herbicide Treatment																																																													
Purchase herbicides for whole-lake				■			\$30,000																																																						
Apply herbicides				■			\$1,600				■			\$1,600				■			\$1,600				■			\$1,600				■			\$1,600																										
																									\$ 143,000.00																																				
Triploid Carp																																																													
Purchase and ship fish				■			\$30,912																																																						
Design and build two fish gates				■			\$40,000																																																						
Stock and monitor fish population							\$600				■			\$800				■			\$800				■			\$800				■			\$600																										
																									\$ 74,616.00																																				
Aquatic Vegetation Harvester																																																													
EH-220 harvester, trailer, and conveyer				■			\$92,025																																																						
Ship harvester				■			\$10,000																																																						
Harvest vegetation, O&M				■			\$35,065				■			\$35,065				■			\$35,065				■			\$35,065				■			\$35,065																										
																									\$ 278,260.00																																				
Aquatic Vegetation Harvester (Contractor)																																																													
Harvest vegetation 30 days per year				■			\$66,000				■			\$66,000				■			\$66,000				■			\$66,000				■			\$66,000																										
																									\$ 560,217.00																																				
Borrow Aquatic Vegetation Harvester																																																													
Transport harvester two and from Homer				■			\$2,000				■			\$2,000				■			\$2,000				■			\$2,000				■			\$2,000																										
Harvest vegetation, O&M				■			\$35,065				■			\$35,065				■			\$35,065				■			\$35,065				■			\$35,065																										
																									\$ 178,235.00																																				
Weed Mower																																																													
Purchase and ship one Jensen Weed Mower				■			\$1,998																																																						
Rake 325 floatplane slips 2x per year				■			\$1,800				■			\$1,800				■			\$1,800				■			\$1,800				■			\$1,800																										
																									\$ 10,282.00																																				
Weed Cutters																																																													
Purchase and ship ten Swordfish cutters				■			\$20,020																																																						
Rake 325 floatplane slips 2x per year				■			\$8,125				■			\$8,125				■			\$8,125				■			\$8,125				■			\$8,125																										
																									\$ 57,636.00																																				
Weed Rakes																																																													
Purchase and ship ten Deluxe rakes				■			\$1,350																																																						
Rake 325 floatplane slips 2x per year				■			\$16,250				■			\$16,250				■			\$16,250				■			\$16,250				■			\$16,250																										
																									\$ 76,585.00																																				

Scenario 2 – ANC and Tenants Share

ANC	2005					2006					2007					2008					2009					5-year Present Worth Costs					
	j	f	m	a	m	j	f	m	a	m	j	f	m	a	m	j	f	m	a	m	j	f	m	a	m		j	f	m	a	m
Herbicide Treatment																															
Sonar A.S. cost for whole-lake treatment																															
Apply herbicides																															
																															\$ 143,000.00
Herbicides																															
Navigate cost for 10-foot deep littoral zone*																															
Apply herbicides																															
																															\$ 310,712.00
Purchase Vegetation Harvester																															
EH-220 harvester, trailer, and conveyer																															
Ship harvester																															
Harvest vegetation, O&M																															
																															\$ 278,260.00
Contract Out Vegetation Harvester																															
Harvest vegetation 30 days per year																															
																															\$ 2,295.50
Borrow EH-220 Vegetation Harvester																															
Ship harvester																															
Harvest vegetation, O&M																															
																															\$ 178,035.00
Individual Slip Owners																															
Weed Cutters																															
Purchase and ship one Swordfish cutter																															
One floatplane slips 2x per year																															
																															\$ 2,180.00
Weed Rakes																															
Purchase and ship one rake																															
Rake one floatplane slips 2x per year																															
																															\$ 366.50

Scenario 3 – Tenants take care of slips, ANC does nothing

Individual Slip Owners	2005												2006												2007												2008												2009												5-year Present Worth Costs
	j	f	m	a	m	j	j	a	s	o	n	d	j	f	m	a	m	j	j	a	s	o	n	d	j	f	m	a	m	j	j	a	s	o	n	d	j	f	m	a	m	j	j	a	s	o	n	d	j	f	m	a	m	j	j	a	s	o	n	d	
Weed Cutters																																																													
Purchase and ship one Swordfish cutter	█ \$2,064																																																												
One floatplane slips 2x per year	█ \$25												█ \$25												█ \$25												█ \$25												█ \$25												
																																																													\$ 2,180.00
Weed Rakes																																																													
Purchase and ship one rake	█ \$135																																																												
Rake one floatplane slips 2x per year	█ \$50												█ \$50												█ \$50												█ \$50												█ \$50												
																																																													\$ 366.50

Selected Vegetation Management Scenario

- **Scenario 2** – ANC is responsible for controlling vegetation in open water; slip owners maintain their own slips with ANC's guidance

Selected Vegetation Management Scenario

- **ANC**
 - During the summer of 2005, ANC will borrow Homer's Harvester when available, and will retain the use of a contractor for no more than 5-days per year.
 - ANC will work through the year to purchase and own an aquatic harvester that will be ready for use in the summer of 2006.
- **Tenants**
 - Will rake and remove vegetation using the Airport's rakes or purchase of their own. ANC will offer assistance when required.

Aquarius Vegetation Harvesters

- EH-220 can 0.30 acres per hour; 5-ft. cutter width, 3,200 lbs. storage capacity
- HM-320 can cover 0.37 acres per hour; 6-ft. cutter width, 7,025 lbs. storage capacity
- HM-420 can cover 0.43 acres per hour; 7-ft. cutter width, 10,500 lbs. storage capacity
- Shore conveyor costs \$20,500
- Trailer costs \$7,875 for EH-220 and \$9,450 for HM-320 and 420



Selected Control Options: 5-Year Present Worth Costs

ANC	
Borrow Homer's EH-220 Vegetation Harvester for Summer 2005	\$40,065
Contracted Harvester, 5-days per year during Summer 2005	\$11,000
Purchase Harvester for use starting in 2006	\$254,285
Individual Slip Owners	
Weed Rakes	\$366

Final Aquatic Vegetation Management Plan

Annual Capital and O&M Costs over 5-Year Implementation Schedule

ANC	2005												2006												2007												2008												2009												5-year Present Worth Costs												
	j	f	m	a	m	j	j	a	s	o	n	d	j	f	m	a	m	j	j	a	s	o	n	d	j	f	m	a	m	j	j	a	s	o	n	d	j	f	m	a	m	j	j	a	s	o	n	d	j	f	m	a	m	j	j	a	s	o	n	d													
Borrow EH-220 Vegetation Harvester (2005)																																																																									
Ship harvester																																																																									
Harvest vegetation, O&M																																																																									
																																																																									\$ 40,065.00
Contract Out Vegetation Harvester (2005)																																																																									
Harvest vegetation 5 days per year as needed																																																																									
																																																																									\$ 11,000.00
Purchase Vegetation Harvester (2006)																																																																									
EH-220 harvester, trailer, and conveyer																																																																									
Ship harvester																																																																									
Harvest vegetation, O&M																																																																									
																																																																									\$ 254,285.00
Individual Slip Owners																																																																									
Weed Rakes																																																																									
Purchase and ship one Deluxe Rake																																																																									
Rake one floatplane slips 2x per year																																																																									
																																																																									\$ 366.50

Questions?



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