

FLORIDA HYDRILLA MANAGEMENT SUMMIT

ORLANDO, FLORIDA
DECEMBER 6-7, 2005

FACILITATOR'S SUMMARY REPORT



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Executive Summary

The Florida Hydrilla Management Summit was dedicated by Bill Torres to the memory of Vic Ramey who worked with his colleagues in Florida to develop a more informed, scientifically-based approach to aquatic plant management.

On December 6-7, 2005, the Florida Department of Environmental Protection convened the Florida Hydrilla Management Summit held in Orlando, Florida. A range of perspectives were represented among the 65 summit participants including 17 private sector representatives (*14 from for profit companies and 3 from non profit organizations*), 22 representatives of State agencies (*12 from FDEP, 4 from the FWC and 6 from Water Management Districts*); 5 participants represented local governments; and 6 participants represented federal agency perspectives. In addition, there were four academic researchers participating. Of the Summit participants, 22 identified themselves as managers, 25 as scientists and 4 as policy makers.

In preparation for the Summit, the facilitators created and made available in October, 2005 an online pre-summit survey using six issue areas that were identified in the June, 2005 report titled, "Hydrilla Management in Florida." The results from the thirty-nine respondents representing public and private sector perspectives were compiled and made available for review by participants the week before the Summit. The survey results were also used to design the agenda and problem statement and draft recommendation worksheets that served as a basis for discussion and refinement during the Summit.

Following welcoming remarks by Bill Torres, Chief of the DEP Bureau of Invasive Plant Management, Jeff Schardt (DEP) provided an update on the status of hydrilla management in Florida public waters with background statistics and an outline of critical issues related to each recommendation in the "Hydrilla Management in Florida" report.

The Summit participants then reviewed common problem statements and recommendations based on the online survey results and suggested revisions that were recorded by facilitators and were acceptable to the Summit participants. They addressed problem statements in each area and a total of 15 specific recommendations in five areas of hydrilla management including:

INTEGRATED LARGE-SCALE HYDRILLA MANAGEMENT PLANS

With Recommendations addressing:

1. Hydrilla Management Research Funding
2. Develop Long-Range Integrated Aquatic Plant Management Plans
3. Implement Aquatic Plant Maintenance Programs
4. Small-Scale Herbicide Hydrilla Management

TRIPLOID GRASS CARP REMOVAL TECHNIQUES

With a Recommendation addressing:

1. Funding Research on the Effectiveness of Triploid Grass Carp as a Hydrilla Management Tool

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With Recommendations addressing:

1. Fluridone Resistant Hydrilla
2. Selectivity Recommendation
3. Resistance Management Strategy
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WATER REGULATION SCHEDULES AND HERBICIDE USE IN THE KISSIMMEE CHAIN OF LAKES AND LAKE ISTKOKPOGA.

With Recommendations addressing:

1. Conduct an Engineering and Cost and Risk Assessment of the Impact of Hydrilla on Flood Control on the Kissimmee Chain of Lakes and Lake Istokpoga
2. Regulation Schedules and Reduced Water Levels and Flow
3. Develop Long-Term Aquatic Plant Management and Monitoring Plans
4. Minimize Non-Target Impacts on Fish and Wildlife Habitat

WILDLIFE AND FISHERIES MANAGEMENT

With Recommendations addressing:

1. Minimize Non-Target Impacts.
2. Maintenance Program for Water Bodies with Widespread Hydrilla Populations

At the conclusion of the Summit, DEP thanked the Summit participants and agreed to review and develop a plan for implementing recommendations from the Summit. DEP also agreed to place the Summit report to be compiled by the facilitators on its web site and disseminate the Summit report to the participants.

The following are the Common Problem Statements and Recommendations as revised, recorded by facilitators and agreed upon by the participants in the course of the plenary discussions during the Florida Hydrilla Management Summit held in Orlando, Florida on December 6-7, 2005.

INTEGRATED LARGE-SCALE HYDRILLA MANAGEMENT PLANS

A. Overall Common Problem Statement

Integrated management includes the development and implementation of water body plans that prioritize functions and requires the consideration of all options, in order to choose the best tools available for each water body.

B. Recommendations

1. Hydrilla Management Research Funding. Based on the extent of fluridone resistant hydrilla (FRH), the identification and development of new hydrilla control strategies is critical. The Florida Department of Environmental protection (FDEP) should immediately re-invigorate Florida's research efforts for aquatic plant management programs. FDEP should lead by seeking to obtain needed state and federal funding, with a goal of between 5-10% of FDEP's existing operation budget. It should enter into agreements with universities, federal agencies or private entities for research and the development of new or improved aquatic plant control methods.

2. Develop Long-Range Integrated Aquatic Plant Management Plans. FDEP should continue to establish initial working groups composed of FDEP and Florida Fish and Wildlife Conservation Commission (FWC) staff for each lake/aquatic system receiving significant State of Florida aquatic plant management funds. The working group should be charged with developing a preliminary, written, long-range integrated aquatic plant management plan for each lake. Other appropriate state and federal agencies will be notified of the formation of these working groups and those agencies will be allowed to determine whom among their staff are best qualified to provide input on the development of the plan. The working group should consider stakeholder input throughout the development of lake management plans. The plans should consider the primary or planned use of the water body, the optimum sustained use by the public of the water body's living aquatic resources, and/or sound biological management principles. The working groups shall also determine the historical level of hydrilla infestation, current status of hydrilla, and technologies and funding available for control when determining the "lowest feasible level" of hydrilla. These plans should be developed with the recognition that protection of human health, safety, and recreation are mandated by the Florida legislature when determining "lowest feasible levels" of hydrilla.

3. Implement Aquatic Plant Maintenance Programs. On public water bodies with widespread hydrilla populations, FDEP and cooperators shall consider implementing a maintenance program using all available management options. The initial focus shall be on public access points, navigation and trails to maintain recreational use. In many aquatic systems hydrilla constitutes the vast majority of remaining submersed vegetation. Therefore, while goals are to maintain native submersed plants, aquatic plant managers will be faced with recognizing hydrilla as a

constituent of the submersed vegetation community.

4. Small-Scale Herbicide Hydrilla Management Prevention. As a prevention strategy, when possible, intense but small-scale herbicide management of hydrilla is preferable to large-scale whole-lake herbicide management efforts. In the case of larger lakes, this requires a considerable commitment to surveillance, sound reporting of the exact locations and size of hydrilla infestations, rapid action, and aquatic plant managers who can make decisions on the optimal treatment recommendations for insuring that small infestations are not allowed to spread. This recommendation fits with the current priority list of the FDEP regarding intense management of new finds, and this strategy should be employed to delay the spread of hydrilla, especially resistant strains.

TRIPLOID GRASS CARP REMOVAL TECHNIQUES

A. Common Problem Statement

More than 20 years of research and management involving the use of grass carp as an effective tool for aquatic plant control have not met the resource goals for plant management on large public waters. The tool's efficacy and standard use must be considered in the context of both large and small lakes and in the need to remove the fish as needed. If a better removal process can be found, a broad but low rate of grass carp in combination with other tools could be used effectively for aquatic plant control.

B. Recommendation

- 1. Fund Research on the Effectiveness of Triploid Grass Carp as a Hydrilla Management Tool.** Before utilizing grass carp as a tool in large public water bodies, we recommend making funds available to support more research and better documentation and monitoring to determine the effectiveness of Triploid Grass Carp as a hydrilla management tool including:

- Removal techniques;
- How to maintain and or restore native vegetation for fish and wildlife habitat when using grass carp to manage hydrilla;
- Management practices using lower stocking rates over time; and
- The use of containment barriers, including electric.

CURRENT AND FUTURE CHEMICAL MANAGEMENT PRACTICES FOR HYDRILLA

A. Common Problem Statement

For the past 6 years, the discovery and onset of FRH has reduced our ability on some lakes to cost effectively and selectively control hydrilla in Florida public waters without limited impacts to native plant species. We currently rely on endothall as our primary

alternative to fluridone. This limited suite of chemical tools presents potential risks and challenges for future hydrilla management.

B. Recommendations

1. Fluridone Resistant Hydrilla. Based on the extent of fluridone resistant hydrilla (FRH), the identification and development of new herbicides for hydrilla control strategies is critical. FDEP should immediately re-invigorate Florida's chemical research efforts for aquatic plant management programs. FDEP should lead by obtaining needed state and federal funding (goal of a range of 5-10% of FDEP's existing operation budget), and entering into agreements with universities, federal agencies or private entities for research and the development of new or improved aquatic plant control methods.

2. Selectivity. There is a strong need to improve our ability to quantify the impact that herbicides are having on key non-target plant species. Methodologies for collecting reliable and useful field data need to be established among responsible agencies and researchers so results can be compared across both managed and unmanaged water bodies and sites treated at different herbicide use rates.

3. Resistance Management Strategy. For sites where hydrilla remains susceptible to fluridone, consecutive year applications are discouraged. It is also crucial that resistance management strategies be developed to prevent hydrilla from developing resistance to other herbicides.

4. Rotation of Contact Products. In addition to considering rotation schemes with fluridone, aquatic managers also need contact products that can be rotated with Aquathol. There are currently no new contact products being considered for registration. In order to provide a new tool that would be available for immediate use, combinations of products should be further evaluated. We recommend that copper only be considered for hydrilla control when used in combination with the herbicide diquat or other registered herbicides. Research should be conducted to determine if low rates of products such as the dimethylalkylamine formulation of endothall or hydrogen peroxide can enhance the activity of diquat or endothall for spot control of hydrilla. As the treatment of new infestations is the top FDEP priority for hydrilla control, addition of a new contact product would provide a highly useful tool to address this priority.

WATER REGULATION SCHEDULES AND HERBICIDE USE IN THE KISSIMMEE CHAIN OF LAKES AND LAKE ISTKOKPOGA.

A. Overall Common Problem Statement

The issue of flood control has been a rationale for whole lake treatment of hydrilla over the last decade. Hydrilla may pose a flood control problem under certain conditions in Kissimmee Chain of Lakes (KCOL) and Lake Istokpoga. This needs to be addressed by researchers and managers to help identify priority flood control and drainage areas where hydrilla control within a lake is necessary and the relationship among water flow, contact time and effectiveness of herbicides.

B. Recommendations

1. Conduct an Engineering and Cost and Risk Assessment of the Impact of Hydrilla on Flood Control on the Kissimmee Chain of Lakes and Lake Istokpoga. A formal request has been made to the Jacksonville District of the US Army Corps of Engineers (USACE) for a detailed response as to the threat hydrilla causes to flood control so that the minimal level of hydrilla control can be defined. This inquiry should include KCOL and Lake Istokpoga where FDEP Aquatic Plant funds are likely to be spent to reduce hydrilla. The response should include an engineering, cost and risk assessment of the amount and locations of hydrilla that could create an increased risk of flooding. Once such a response is formulated, aquatic plant managers can develop plans to insure that hydrilla is managed in critical areas that represent an increased risk of flooding.

2. Regulation Schedules and Reduced Water Levels and Flow. As it is possible that new herbicides or treatment programs may require an extended exposure period, it is recommended that an assessment of regulation schedules take into account the improved economics and efficacy that reduced water levels and flow can afford. In lieu of deviation requests on a yearly basis, the impact of deviation requests every two or three years should be studied, including the impacts to fish and wildlife. The seasonality of treatments may be adjusted based on the ability to manipulate water levels/flow during various times of the year.

3. Develop Long-Term Aquatic Plant Management and Monitoring Plans. In view of the increase in FRH in these lakes, the FDEP, SFWMD, USACE with input from other affected agencies and stakeholders must develop long-term aquatic plant management and monitoring plans for how, when, and where to manage hydrilla.

4. Minimize Non-Target Impacts on Fish and Wildlife Habitat. Hydrilla management actions should aim to keep non-target impacts to a minimum because non-target impacts of hydrilla control measures on native plants could greatly reduce available fish and wildlife habitat. Where control of resistant hydrilla is limited because of budgetary considerations and/or insufficient selective management tools and where hydrilla coverage is not impacting the designated uses of a lake, immediate hydrilla control may not be necessary. Where water level manipulations are needed to improve the efficiency of hydrilla controls aquatic plant management plans should consider the impacts of water level changes on fish and wildlife populations.

VI. WILDLIFE AND FISHERIES MANAGEMENT

A. Common Problem Statement

Hydrilla control can have potential positive and negative impacts on fish and wildlife depending on the unique characteristics of the system. Integrated objectives for hydrilla management and fish and wildlife in lake systems have not been clearly defined and agreed to by managers.

B. Recommendations

1. Minimize Non-Target Impacts. Hydrilla management actions should aim to keep non-target impacts to a minimum because non-target impacts of hydrilla control measures on native plants could greatly reduce available fish and wildlife habitat. Where control of resistant hydrilla is limited because of budgetary considerations and/or insufficient selective management tools and where hydrilla coverage is not impacting the designated uses of a lake, immediate hydrilla control may not be feasible. Where water level manipulations are needed to improve the effectiveness of hydrilla controls, aquatic plant management plans should consider all impacts of water level changes.

2. Maintenance Program for Water Bodies with Widespread Hydrilla Populations. On public water bodies with widespread hydrilla populations, FDEP and cooperators shall consider implementing a maintenance program using all available management options. The initial focus shall be on public access points, navigation and trails to maintain recreational use. In many aquatic systems hydrilla constitutes the vast majority of remaining submersed vegetation. Therefore, while goals are to maintain native submersed plants, aquatic plant managers will be faced with recognizing hydrilla as a constituent of the submersed vegetation community.



Facilitator Hal Beardall reviewing consensus on Summit recommendations

I. CONTEXT AND PROGRAM STATUS

A. Welcome

Bill Torres, Bureau Chief, Florida Department of Environment Protection, Bureau of Invasive Plant Management, welcomed the 65 participants to the Florida Hydrilla Management Summit (Summit). (See, Appendix 3 for a list of the participants). He thanked participants for their contribution of time and energy in helping the Florida Department of Environmental Protection (FDEP) develop an effective program, including those that responded to the online survey upon which the Summit was organized. He was pleased to see the range of stakeholder perspectives at the Summit and noted that the results of the Summit, especially those where participants were in agreement, will help DEP and its partners implement changes that may be needed to address and improve hydrilla management in Florida in the face of the current challenges. Mr. Torres also asked participants to take a moment of silence in memory of the contributions to the State of Florida by Vic Ramey, of the University of Florida, Center for Aquatic and Invasive Plants who recently passed away.

B. Pre-Summit On-line Survey and Organization

In October, the facilitators created and made available an online pre-Summit survey using six issue areas identified in the June 2005 report titled “Hydrilla Management in Florida.” The results from the thirty-nine respondents representing public and private sector perspectives were compiled and made available for review by participants the week before the summit. The survey results were used to design the agenda and problem statement and draft recommendation worksheets that served as a basis for discussion and refinement during the Summit.

C. Summit Participants (*see full list of individual participants in Appendix #3*)

To give members a sense of the perspectives being represented at the Summit, the facilitators asked Summit participants to identify their perspective on the issues through a show of hands. The following is a breakdown of their respective perspectives:

- Private sector - 17 with: 14 for profit; 3 not for profit
- State agencies - 20 with 12 from DEP; 4 from FWC; and 6 from WMDs
- Local government - 5
- Federal agencies - 6
- Academic – 4

The following is a breakdown of their professional perspectives:

- Managers - 22
- Scientists - 25
- Policy makers – 4

D. Current Program Status of Hydrilla Management (*see Appendix #7*)

An additional section was added to the pre-summit survey results offering an update from Jeff Schardt (FDEP) on the current program status of hydrilla management in Florida with

background statistics and an outline of critical issues related to each recommendation in the “Hydrilla Management in Florida” report.

E. Current Perspectives on Hydrilla Management and Science (*See, Appendix #5, Survey Summary*)

The facilitators noted that the pre-Summit survey started with three broad questions. The first two asked if, overall, hydrilla issues in Florida are being adequately addressed by science and by management. The third question asked what is the potential value of stronger links between the two.

The facilitators offered the following summary of the survey results. In the first two questions respondents recognized that progress was being made but that we can and need to do more to meet the challenges. There needs to be an ongoing discussion between scientists, managers and others to keep us going in the right direction. The scores to the third set of questions regarding stronger links between science and management indicated that while the two have not always communicated well, improving dialogue, cooperation and partnerships can only enhance the chances of effectively addressing hydrilla issues. One of the primary goals of this Summit is to continue working with participants to build more effective means of communication between scientists and managers to address hydrilla management issues.

The following pre-Summit survey results used a five point agreement scale with “5 = strongly agree” to “1 = disagree.” Alternatively, respondents could indicate “0 = don’t know enough to answer.”

I. OVERALL, HYDRILLA ISSUES IN FLORIDA ARE BEING ADEQUATELY ADDRESSED BY SCIENCE. (3.2 All)			
<i>Professional Perspectives</i>			
Managers,	7 Responses,	Avg. 3.9	Scientist,
Policy Maker,	3 Responses,	Avg. 4.0	Other,
			13 Responses, Avg. 3.1
			1 Response, Avg. 2.0
II. OVERALL, HYDRILLA ISSUES IN FLORIDA ARE BEING ADEQUATELY ADDRESSED BY MANAGEMENT. (3.3 All)			
<i>Professional Perspectives</i>			
Managers,	7 Responses,	Avg. 3.6	Scientist,
Policy Maker,	3 Responses,	Avg. 4.0	Other,
			13 Responses, Avg. 3.4
			1 Response, Avg. 2.0

III. OVERALL, WHAT IS THE POTENTIAL VALUE OF STRONGER LINKS BETWEEN HYDRILLA MANAGEMENT AND SCIENCE?			
1. Progress is increased when scientists and managers jointly set vision, goals, objectives, timetables and financial plans and work together through this agenda. (All 4.6)			
<i>Professional Perspectives</i>			
Managers,	7 Responses,	Avg. 4.2	Scientist,
Policy Maker,	3 Responses,	Avg. 4.3	Other,
			13 Responses, Avg. 4.3
			1 Response, Avg. 5.0

2. A more effective means of communication between scientists and managers is needed to address hydrilla issues. (3.7 All)

Professional Perspectives

Managers, 7 Responses, Avg. 3.0	Scientist, 13 Responses, Avg. 3.3
Policy Maker, 3 Responses, Avg. 1.3	Other, 1 Response, Avg. 5.0

3. The synthesis of scientific data into ways that can be effectively used by managers would contribute to improved hydrilla management. (4.5 All)

Professional Perspectives

Managers, 7 Responses, Avg. 4.0	Scientist, 13 Responses, Avg. 4.6
Policy Maker, 3 Responses, Avg. 3.7	Other, 1 Response, Avg. 5.0

F. Structure of the Summit Report

The following report is divided into the same six issue areas used in the pre-Summit survey, the Summit agenda and worksheets used to guide participant discussion of hydrilla management issues. In each issue area or section participants were asked to review and refine an overall draft common problem statement initially drafted by the facilitators from the pre-Summit survey responses. Participants then reviewed, discussed and refined the recommendations from the June 2005 report titled “Hydrilla Management in Florida.” The recommendations were assigned to respective sections by the facilitators.

Discussion of the common problem statements and recommendations was guided by an initial acceptability ranking, demonstrated by a show of hands using the following three-point scale:

- 3 = “I can support this as is” (from wholehearted agreement to I can live with this)
- 2= “I can support this, but would like to see the following changes...
- 1 = “I can not support this unless serious concern(s) are addressed as follows...

Participants giving a statement or recommendation a “1” or a “2” were asked to state their concern and to suggest possible improvements to address their concern that were acceptable to the group as a whole. When appropriate the facilitators would ask for a second ranking of a statement or recommendation as discussed and revised. Notes in italics are added to indicate when a recommendation was moved to a new section or a second ranking on the revised language was not taken.

Additional information such as the agenda packet, list of participants, meeting evaluation and a summary of the pre-Summit survey results are available in the appendices.

II. INTEGRATED LARGE-SCALE HYDRILLA MANAGEMENT PLANS

A. Overall Draft Common Problem Statement

As Refined

Integrated management includes the development and implementation of water body plans that prioritize functions and requires the consideration of all options, in order to choose the best tools available for each water body.

Initial Statement with Strike Through/Underline Revisions:

Integrated management ~~should~~ includes guides inform the development and implementation of water body plans that prioritize functions and ~~should~~ requires the consideration assessment of all options, ~~including bio-control agents~~ in order to choose the best tools available for each water body.

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<i>Avg.</i>
Initial Ranking	0	46	2	2.0
Second ranking as revised	36	8	2	2.7

(see clean version above)

12-6 Summit Comments and Suggestions

- “Include” or “Involve” or “guide” vs. “inform”
- Target of this info- who is informed? Not addressing always the right people with this.
- Who is the management plan being developed for? The public? For management? Both?
- Should bio control agents be listed? One of several controls? This should be more general?
- Change “should” to “must”?
- Discussion needed regarding management goals in this problem statement?
- Is “no management” or doing nothing part of an integrated option? Can be a conscious management decision.
- “Consideration” vs. assessment. What is meant here by “assessment”?

B. Recommendations

1. Hydrilla Management Research Funding Recommendation (*new – drawn from #3 initially in Chemical Management*). Based on the extent of fluridone resistant hydrilla (FRH), the identification and development of new hydrilla control strategies is critical. FDEP should immediately re-invigorate Florida’s research efforts for aquatic plant management programs. FDEP should lead by seeking to obtain needed state and federal funding, with a goal of between 5-10% of DEP’s existing operation budget. It should enter into agreements with universities, federal agencies or private entities for research and the development of new or improved aquatic plant control methods.

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<i>Avg.</i>
Initial Ranking	15	35	4	2.2

NOTE: This recommendation was initially reviewed as #3 under the Chemical Management section. After suggesting revisions the participants agreed to place this revised statement in the

Integrated Management Section. No additional exit or second ranking was taken since no one expressed any serious remaining concerns

12-6 Summit Comments and Suggestions

- Should go to all areas as clarified. But we need to give more direction in terms of priorities.
- Come back to this on day 2 and look at the overall research questions that may emerge in discussion. May need a separate forum for this.
- Difficult now to justify 10% at this point. Need to develop agreement on a road map for how the research will be undertaken and the criteria for setting priorities.
- Third paragraph not needed now that it is general/overarching related to the growing resistance problem identified.
- Does this all go to hydrilla? What of other aquatic plants? Should cover all aquatic plant management.
- How will noting the goal of up to 10% be treated by DEP? Make investment decisions on the merits of the research proposed. Will it constrain or force research investment decisions?
- Propose an investment range (e.g. 5-10%) to reflect its importance.
- Helpful focus on supporting graduate students for future researchers and getting good cost effective research results.

2. Develop Long-Range Integrated Aquatic Plant Management Plans. Florida Department of Environmental Protection (FDEP) should continue to establish initial working groups composed of FDEP and Florida Fish and Wildlife Conservation Commission (FWC) staff for each lake/aquatic system receiving significant State of Florida aquatic plant management funds. The working group should be charged with developing a preliminary, written, long-range integrated aquatic plant management plan for each lake. Other appropriate state and federal agencies will be notified of the formation of these working groups and those agencies will be allowed to determine whom among their staff are best qualified to provide input on the development of the plan. The working group should consider stakeholder input throughout the development of lake management plans. The plans should consider the primary or planned use of the water body, the optimum sustained use by the public of the water body's living aquatic resources, and/or sound biological management principles. The working groups shall also determine the historical level of hydrilla infestation, current status of the hydrilla, and technologies and funding available for control when determining the "lowest feasible level" of hydrilla. These plans should be developed with the recognition that protection of human health, safety, and recreation are mandated by the Florida Legislature when determining "lowest feasible levels" of hydrilla.

2. Develop Long-Range Integrated Aquatic Plant Management Plans. Recommendation 1 : Florida Department of Environmental Protection (FDEP) should continue to begin establish initial working groups composed of ~~senior~~ FDEP and Florida Fish and Wildlife Conservation Commission (FWC) staff for each lake/aquatic system receiving significant State of Florida aquatic plant management funds. The working group should be charged with developing a preliminary, written, long-range integrated aquatic plant management plan for each lake. Other

appropriate state and federal agencies will be notified of the formation of these working groups and those agencies will be allowed to determine whom among their staff are best qualified to provide input on the development of the plan. The working group should consider stakeholder input throughout the development of lake management plans. The plans should consider the primary or planned use of the water body, the optimum sustained use by the public of the water body's living aquatic resources, and/or sound biological management principles. The working groups shall also determine the historical level of hydrilla infestation, current status of the hydrilla, and technologies and funding available for control when determining the "lowest feasible level" of hydrilla. These plans should be developed with the recognition that protection of human health, safety, and recreation are mandated by the Florida Legislature when determining "lowest feasible levels" of hydrilla.

Acceptability Ranking:	<i>3</i>	<i>2</i>	<i>1</i>	<i>Avg.</i>
Initial ranking	3	35	1	2.0
Second ranking as revised	31	5	0	2.9

12-7 Summit Comments and Suggestions

- How many lakes? Which ones? FHR lakes?
- FDEP develops an annual work plan. Is this already being done? Is stakeholder input the new part? It will take time to get the input
- Many water bodies haven't got their stakeholders involved in their plans. Needs to be done
- Control plans- annual and a longer term plan dealing with goals
- This doesn't directly address integrated control - speaks only to the development of management plans.

3. Implement Aquatic Plant Maintenance Programs. On public water bodies with widespread hydrilla populations, FDEP and cooperators shall consider implementing a maintenance program using all available management options. The initial focus shall be on public access points, navigation and trails to maintain recreational use. In many aquatic systems hydrilla constitutes the vast majority of remaining submersed vegetation. Therefore, while goals are to maintain native submersed plants, aquatic plant managers will be faced with recognizing hydrilla as a constituent of the submersed vegetation community.

3. Implement Aquatic Plant Maintenance Programs. Recommendation 12: On public water bodies with widespread hydrilla populations, FDEP and cooperators shall consider implementing a maintenance program using all available management options. The initial focus shall be on public access points, navigation and trails to maintain recreational use. In many aquatic systems hydrilla constitutes the vast majority of remaining submersed vegetation. Therefore, while goals are to maintain native submersed plants, aquatic plant managers will be faced with recognizing hydrilla as a constituent of the submersed vegetation community.

Acceptability Ranking:	<i>3</i>	<i>2</i>	<i>1</i>	<i>Avg.</i>
Initial ranking	3	28	13	1.8
Second ranking as revised	31	7	2	2.7

This recommendation was initially reviewed as part of the section on current and future chemical management practices. After suggesting revisions the participants agreed to place this revised statement in the Integrated Management Section

12-7 Summit Comments and Suggestions

- What is the linkage to fish and wildlife? Is this misplaced in this section? Integrated management section?
- Concern with % and basis for this related to water body. What about native plant coverage, needs of lake?
- If a relatively un-impacted lake, is there a problem with 15% coverage?
- Assurances in the % for maintaining fish habitat for anglers. Could be both native and exotic
- Problem with “trails”?

4. Small-Scale Herbicide Hydrilla Management Prevention. As a prevention strategy, when possible, intense but small-scale herbicide management of hydrilla is preferable to large-scale whole-lake herbicide management efforts. In the case of larger lakes, this requires a considerable commitment to surveillance, sound reporting of the exact locations and size of hydrilla infestations, rapid action, and aquatic plant managers who can make decisions on the optimal treatment recommendations for insuring that small infestations are not allowed to spread. This recommendation fits with the current priority list of the FDEP regarding intense management of new finds, and this strategy should be employed to delay the spread of hydrilla, especially resistant strains.

4. Small-Scale Herbicide Hydrilla Management Prevention: Recommendation 7:

As a prevention strategy, when possible, intense but small-scale herbicide management of hydrilla is preferable to large-scale whole-lake herbicide management efforts. In the case of larger lakes, this requires a considerable commitment to surveillance, sound reporting of the exact locations and size of hydrilla infestations, rapid action, and aquatic plant managers who can make decisions on the optimal treatment recommendations for insuring that small infestations are not allowed to spread. This recommendation fits with the current priority list of the FDEP regarding intense management of new finds, and this strategy should be employed to delay the spread of hydrilla, especially resistant strains.

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<u>Avg.</u>
Initial Ranking	37	7	4	2.7

12-6 Summit Comments and Suggestions

- Is in the wrong section? Address outside chemical section- Place in integrated management section
- We don't have prevention in another section
- Need to put chemicals in statement
- Is this early detection rapid response recommendation?

This recommendation was originally placed as #7 under Chemical Management. Participants agreed to move and discuss it under Integrated Management section.

Following the discussion above, no additional exit ranking was taken of the recommendation since no one expressed any serious remaining concerns.

Recommendation 13: ~~FDEP work with their cooperators (i.e., become the lead agency) to seek funding for the establishment of a comprehensive aquatic plant management plan at each lake requiring major amounts of state dollars for weed control. These planning efforts should directly incorporate stakeholder concerns and directions for management.~~

Acceptability Ranking:	<i>3</i>	<i>2</i>	<i>1</i>	<i>Avg.</i>
Initial Ranking	0	27	8	1.8

12-6 Summit Comments and Suggestions

- Strike this as a separate recommendation and incorporate it into recommendation # 3 above



Summit participants discussing the issues during a break

III. TRIPLOID GRASS CARP REMOVAL TECHNIQUES

A. Overview of Survey Results

Dave Eggeman provided an initial overview of the results from the pre-Summit survey. Participants were then offered an opportunity to ask questions or provide comments.

Participant questions or comments:

- Defining “public” water bodies? FDEP and FWC definitions?
- Environmental impacts beyond release areas? Downstream effects?
- Containment in large lakes?
- FWC concept for management- long term? Dependent on FDEP data on hydrilla?
- Life expectancy of fish? Up to 20 years. Annual mortality rate.
- Stocking and restocking rate information?
- Who has oversight over certification of stock- e.g. sterility issues. FWS responsible. Consequences for carp suppliers if diploid show up?
- Place the following in the “bin” for a future discussion: what is quality habitat and what is adequate native vegetation?

B. Problem Statement

As Revised

More than 20 years of research and management involving the use of grass carp as an effective tool for aquatic plant control have not met the resource goals for plant management on large public waters. The tool’s efficacy and standard use must be considered in the context of both large and small lakes and in the need to remove the fish as needed. If a better removal process can be found, a broad but low rate of grass carp in combination with other tools could be used effectively for aquatic plant control.

Initial Statement with Strike Through/Underline Revisions:

~~The use of grass carp as a cost effective hydrilla management approach is dependent on its ability to manage selectively. Grass carp is a tool which is not hydrilla host specific. More research is needed to enhance understanding of:~~

- ~~_____ * Grass carp predation and mortality;~~
- ~~_____ * Methods for determining how many fish are in a system;~~
- ~~_____ * New technologies for their removal as necessary; and~~
- ~~_____ * How to maintain adequate native vegetation for fish and wildlife habitat when using grass carp to manage hydrilla.~~

More than 20 years of research and management involving the use of grass carp as an effective tool for aquatic plant control have not met the resource goals for plant management on large public waters (e.g. greater than 1000 surface acres) in Florida. The tool’s efficacy and standard use must be considered in the context of both large and small lakes and in the need to remove the fish as needed. If a better removal process can be found, a broad but low rate of grass carp in combination with herbicides could be used effectively for aquatic plant control in smaller systems.

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<u>Avg.</u>
Initial ranking	6	32	7	2.0

Initial Ranking and Comments 12-6 Comments and Suggestions

- Research understanding: “Adequate”? vs. “Natural levels”? in 4th bullet Definitions?
- Should the 2nd paragraph be the first paragraph?
- No vegetation as natural?
- Does Florida have “natural” systems left? “Adequate” may be a better?
- Removal is part of issue. Selectivity issues as well.
- What was the cause for successes? Quantified?
- What about importance of re-vegetation in hydrilla management? (*Item suggested for the “bin” and future discussion*)
- Is carp a tool for larger systems?
- Why use grass carp? Public perception of chemical herbicide? Part of longer-term solution for hydrilla control at a more reasonable cost. Cost is a factor
- Consider writing a “label” for grass carp use? What would a precautionary statement be?
- Dealing with a vertebrate? Regulatory hurdles involved?
- Will this guide funding for future research? What more can we learn from more research that will make the tool a viable option?
- Some new things out there- pellet injected in muscle issue. Releases agent to kill/remove the carp. Haven’t been tested fully, need more research and review of management implications- for large scale and smaller scale?
- At what level can grass carp research be applicable as you scale up from smaller to larger water bodies?
- Grass carp more art than science

C. Recommendation

1. Funding Research on the Effectiveness of Triploid Grass Carp as a Hydrilla Management Tool. Before utilizing grass carp as a tool in large public water bodies, we recommend making funds available to support more research, better documentation and monitoring to determine the effectiveness of Triploid Grass Carp as a hydrilla management tool including:

- * Removal techniques
- * How to maintain and or restore native vegetation for fish and wildlife habitat when using grass carp to manage hydrilla.
- * Management practices using lower stocking rates over time
- * The use of containment barriers, including electric

Following the initial discussion of the overall problem statement the first paragraph was struck and the initial Recommendation 2 was also struck. A small group was designated to draft overnight a new recommendation for this section. The redrafted recommendation was discussed and revised at the start of the second day, December 7, as follows:

Delete Recommendation 2 and substitute redrafted recommendation below.

~~**Recommendation 2:** Throughout the literature review, Grass Carp Symposium and the Hydrilla Issues Workshop, it is clear that if there was some cost effective and selective method of removing grass carp~~

~~from a lake system before complete eradication of submersed aquatic vegetation was accomplished, then triploid grass carp would be an excellent method of hydrilla control for large and small lakes. Therefore, we recommend making funds available for more research on new techniques for removing grass carp from lakes. Research on this and other methods may be expensive, but a successful method would pay great dividends to aquatic plant management in Florida Lakes. Comments on the first draft of this report echoed warnings from previous studies suggesting that if total elimination of aquatic vegetation is unacceptable, then the use of grass carp to control vegetation in large or small lakes should not be considered. However, if research provides an efficient method to remove grass carp from a lake, then it is recommended that this method be evaluated in a Florida lake requiring aquatic plant control.~~

New Draft 1. Before addressing utilizing grass carp as a tool in larger public water bodies, we recommend making funds available to support more research, better documentation and monitoring to determine the effectiveness of Triploid Grass Carp as a hydrilla management tool including:

- Removal techniques
- How to maintain and or restore native vegetation for fish and wildlife habitat when using grass carp to manage hydrilla.
- Management practices using lower stocking rates over time
- The use of containment barriers, including electric

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<i>Avg.</i>
Second ranking as revised on 12-6	31	11	1	2.6

12-6, Comments on Revised Recommendation and Second ranking

- Will managers have to use this tool if these questions are answered?
- If we have no other tools on big lakes.... Then use carp?
- Keep in mind this is one of several tools. Taking this up early in summit. Keep context of fluridone resistance.
- Have goals been met on smaller lakes.
- Need to prioritize the bullets.

Final Draft 1. Funding Research on the Effectiveness of Triploid Grass Carp as a Hydrilla Management Tool. Before utilizing grass carp as a tool in large public water bodies, we recommend making funds available to support more research, better documentation and monitoring to determine the effectiveness of Triploid Grass Carp as a hydrilla management tool including:

- Removal techniques
- How to maintain and or restore native vegetation for fish and wildlife habitat when using grass carp to manage hydrilla.
- Management practices using lower stocking rates over time
- The use of containment barriers, including electric

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<i>Avg.</i>
Third ranking as revised on 12-7	37	12	2	2.7

12-7 Comments on Revised Recommendation and Third ranking

- Keep it general-focus on removal techniques.
- Make sure habitat is protected
- Only recommendation that explicitly recommends funding.
- What does “large” public water body mean? FWC looks at the characteristics of the lake vs. the size.
- If grass carp is a long-term management tool, need to know how many carp in the system.
- Premised on watching the “plant” community—several approaches to this.



Designated small group discussing grass carp issues and possible recommendations.

IV. CURRENT AND FUTURE CHEMICAL MANAGEMENT PRACTICES FOR HYDRILLA

A. Overview of Survey Results

Mike Netherland provided an initial overview of the results from the pre-Summit survey in each section under chemical management practices for hydrilla. Participants were then offered an opportunity to ask questions or provide comments.

Fluridone Resistant Hydrilla

Participant Comments or Questions:

- #6: Confusion over interpreting the term “direct”
- If 5 ppb has some adverse effects on plants, concerns with increasing 3 to 5 times? Lake Mann study- cattails came back but hydrilla came back more slowly.
- Addresses animal/recreational not plants here? Plant is an indirect issue in terms of target plants. This is a selectivity
- #7” defining “cost effective”? needs clarification. Comparable to other tools?
- Fluridone resistance not referred to directly.

Selectivity Concerns

Participant Comments or Questions:

- #1 Focus on selectivity vs. hydrilla control at higher fluridone rates?
- #2 –higher FHR resulting in shift of plant communities.
- Resistance in native plants? Don’t have evidence?
- Susceptibility of native plants to fluridone? Any lab research results? ALS preliminary results.
- Research information funded by FDEP on hydrilla plants will be made public as soon as possible.

Use of Copper Based Products--Current State Policy

Participant Comments or Questions:

- Copper enhanced diquat and copper as a combined tool? Quantitative vs. qualitative concern.

Potential Development of Alternative Modes of Action

Participant Comments or Questions:

- Things to be learned from terrestrial plant resistance.

B. Common Problem Statement

As Revised

For the past 6 years, the discovery and onset of FRH has reduced our ability on some lakes to cost effectively and selectively control hydrilla in Florida public waters with limited impacts to native plant species. We currently rely on endothall as our primary alternative to fluridone. This limited suite of chemical tools presents potential risks and challenges for future hydrilla management.

On the first day of the Summit participants discussed a draft problem statement drawn from the survey responses and agreed it needed to be reworked. A group representing state, federal and private interests drafted a proposed common problem statement that was reviewed, ranked and revised as shown below on December 7.

~~Initial Problem Statement: Sustainable hydrilla control depends on clarifying the goals and objectives for the management program and developing an integrated approach to determine when and where alternative technologies are most effective. New detection, surveillance and active ingredients may need to be developed and made available, then implemented with additional manpower.~~

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<i>Avg.</i>
Initial ranking	2	44	5	1.9

12-6 Summit Comments and Suggestions on Initial Problem Statement

- This doesn't relate directly to chemical.
- Need to get at resistance and selectivity issues
- We can't effectively manage hydrilla because of growing resistance
- "Sustainable hydrilla management" while looking at individual water bodies?
- Goals and objectives don't equate to sustainable management program?
- What does "sustainable" mean here?
- What about working with available products vs. only new?
- "Alternative technologies" alternative to what? To floridone? Clarify.
- "New detection"? what does it mean- timely or early detection?

Redrafted Common Problem Statement

For the past 6 years, the discovery and onset of FRH has reduced our ability on some lakes to cost effectively and selectively control hydrilla in Florida public waters without limited minimal impactsing to native plant species. We currently rely on endothall as our primary alternative to fluridone, as a means of providing chemical control. This limited suite of chemical tools presents potential risks and challenges for future hydrilla management.

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<i>Avg.</i>
Initial ranking as Redrafted	27	22	1	2.5

Those who gave the redrafted Common Problem Statement a "2" or a "1" were offered an opportunity to suggest improvements which, when agreed to by the group as a whole, are reflected in the redrafted statement above. No exit ranking was taken of the statement since no one expressed any serious remaining concerns.

C. Recommendations

1. Selectivity. There is a strong need to improve our ability to quantify the impact that herbicides are having on key non-target plant species. Methodologies for collecting reliable and useful field

data need to be established among responsible agencies and researchers so results can be compared across both managed and unmanaged water bodies and sites treated at different herbicide use rates.

1. Selectivity Recommendation: *(Note that techniques are utilized both here and in grass carp)* There is a strong need to improve our ability to quantify the impact that herbicides fluridone or other lake management techniques are having on key non-target plant species. Methodologies for collecting reliable and useful field data need to be established worked-out among between responsible agencies and researchers so results can be compared across both managed and unmanaged water bodies and sites treated at different herbicide fluridone use rates.

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<u>Avg.</u>
Initial Ranking	11	31	0	2.3
Ranking as Revised	42	2	0	3.0

Those who gave the recommendation a “2” were offered an opportunity to suggest improvements to address their minor concerns. The suggestions, when agreed to by the group as a whole, are reflected in the redrafted statement above. No exit (or third) ranking was taken of the statement since no one expressed any serious remaining concerns.

2. Resistance Management Strategy. For sites where the hydrilla remains susceptible to fluridone, consecutive year applications are discouraged. It is also crucial that resistance management strategies be developed to prevent hydrilla from developing resistance to other herbicides.

2. Resistance Management Strategy Recommendation

For sites where the hydrilla remains susceptible to fluridone, consecutive year applications are discouraged. It is also crucial that resistance management strategies be developed to prevent hydrilla from developing resistance to other herbicides.

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<u>Avg.</u>
	37	8	1	2.8

12-6 Summit Comments and Suggestions

- Doesn't discuss low rates which would be good-
- Stop tuber production- Fall applications- big shift from current management practice
- This is only fluridone treatments.

Following the discussion above, no exit ranking was taken of the recommendation since no one expressed any serious remaining concerns once the suggestions had been discussed.

3. Rotation of Contact Products. In addition to considering rotation schemes with fluridone, aquatic managers also need a contact products that can be rotated with Aquathol. There are currently no new contact products being considered for registration. In order to provide a new

tool that would be available for immediate use, combinations of products should be further evaluated. We recommend that copper only be considered for hydrilla control when used in combination with the herbicide diquat or other registered herbicides. Research should be conducted to determine if low rates of products such as the dimethylammonium formulation of endothall or hydrogen peroxide can enhance the activity of diquat or endothall for spot control of hydrilla. As the treatment of new infestations is the top FDEP priority for hydrilla control, addition of a new contact product would provide a highly useful tool to address this priority.

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<u>Avg.</u>
Initial Ranking	18	30	0	2.4

12-6 Summit Comments and Suggestions

- Look at copper question another time?
- Aquatic managers or plant managers?
- Research on use dyes? Not definitive results to add as a management recommendation at this point. Managing growth vs. controlling the plant.
- Formulation issue- liquids substituting for granule?

Following the discussion above no exit ranking was taken of the recommendation since no one expressed any serious remaining concerns.

V. WATER REGULATION SCHEDULES AND HERBICIDE USE IN THE KCOL/LAKE ISTKOKPOGA.

A. Overview of Survey Results

Jeff Schardt provided an initial overview of the results from the pre-Summit survey in each section under chemical management practices for hydrilla. Participants were then offered an opportunity but did not ask questions or provide additional comments.

B. Overall Draft Common Problem Statement

As Revised

The issue of flood control has been a rationale for whole lake treatment of hydrilla over the last decade. Hydrilla may pose a flood control problem under certain conditions in KCOL and Lake Istokpoga. This needs to be addressed by researchers and managers to help identify priority flood control and drainage areas where hydrilla control within a lake is necessary and the relationship among water flow, contact time and effectiveness of herbicides.

Acceptability Ranking:	3	2	1	Avg.
Initial ranking	11	39	0	2.2
Ranking as Revised	31	4	0	2.9

12-6 Summit Comments and Suggestions

- Not just a fluridone issue. Need to change the first and last sentence.
- How does the flood control issue relate to water regulation schedules. This may be misplaced.

C. Recommendations

1. Conduct an Engineering and Cost and Risk Assessment of the Impact of Hydrilla on Flood Control on the Kissimmee Chain of Lakes and Lake Istokpoga. A formal request has been made to the Jacksonville District of the USACE for a detailed response as to the threat hydrilla causes to flood control so that the minimal level of hydrilla control can be defined. This inquiry should include KCOL and Lake Istokpoga where FDEP Aquatic Plant funds are likely to be spent to reduce hydrilla. The response should include an engineering, cost and risk assessment of the amount and locations of hydrilla that could create an increased risk of flooding. Once such a response is formulated, aquatic plant managers can develop plans to insure that hydrilla is managed in critical areas that represent an increased risk of flooding.

1. Conduct an Engineering and Cost and Risk Assessment of the Impact of Hydrilla on Flood Control on the Kissimmee Chain of Lakes and Lake Istokpoga. A formal request ~~has been~~ will be made to ~~the Jacksonville District of USACE~~ appropriate Water

~~Management Districts~~ for a detailed response as to the threat hydrilla causes to flood control so that the minimal level of hydrilla control can be defined. This inquiry should include KCOL and Lake Istokpoga. ~~all water bodies~~ where FDEP Aquatic Plant funds are likely to be spent to reduce hydrilla. The response should include an engineering, cost and risk assessment of the amount and locations of hydrilla that could create an increased risk of flooding. Once such a response is formulated, aquatic plant managers can develop plans to insure that hydrilla is managed in critical areas that represent an increased risk of flooding.

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<u>Avg.</u>
Initial Ranking	4	26	4	2.0

12-6 Summit Comments and Suggestions

- What is the “engineering assessment”? Hydrologists/engineers.

Following the discussion and revisions made above no exit ranking was taken of the recommendation since no one expressed any serious remaining concerns.

2. Regulation Schedules and Reduced Water Levels and Flow. As it is possible that new herbicides or treatment programs may require an extended exposure period, it is recommended that an assessment of regulation schedules take into account the improved economics and efficacy that reduced water levels and flow can afford. In lieu of deviation requests on a yearly basis, the impact of deviation requests every two or three years should be studied, including the impacts to fish and wildlife. The seasonality of treatments may be adjusted based on the ability to manipulate water levels/flow during various times of the year.

2. Regulation Schedules and Reduced Water Levels and Flow. As it is likely possible that new herbicides or treatment programs may require an extended exposure period, it is recommended that an assessment of regulation schedules take into account the improved economics and efficacy that reduced water levels and flow can afford. In lieu of deviation requests on a yearly basis, the impact of deviation requests every two or three years should be studied, including the impacts to fish and wildlife. The seasonality of treatments may be adjusted based on the ability to manipulate water levels/flow during various times of the year.

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<u>Avg.</u>
Initial Ranking	16	19	1	2.5

12-6 Summit Comments and Suggestions

- Implies herbicide actions with extended exposure periods would be the driver for the water regulation schedules.
- Focuses on large-scale treatments?

Following the discussion and revisions made above no exit ranking was taken of the recommendation since no one expressed any serious remaining concerns.

3. Develop Long-Term Aquatic Plant Management and Monitoring Plans. In view of the increase in FRH in these lakes, the FDEP, SFWMD, USACE with input from other affected agencies and stakeholders must develop long-term aquatic plant management and monitoring plans for how, when, and where to manage hydrilla. It is important that priority zones for access, navigation, and habitat improvement are included in a lake management plan that does not include the use of fluridone.

3. Develop Long-Term Aquatic Plant Management and Monitoring Plans. In view of the increase in FRH in these lakes, increased research efforts and potential new hydrilla management tools, the FDEP, SFWMD, USACE with input from other affected agencies and stakeholders FDEP, FWC and South Florida Water management District (SFWMD), FWS must should continue need to develop long-term aquatic plant management and monitoring plans for how, when, and where to manage hydrilla. on the large flood control lake systems. **Justification:** If the hydrilla infestations become more severe on these systems, increasing fluridone rates may not be a feasible option. It is important that priority zones for access, navigation, and habitat improvement are included in a lake management plan that does not include the use of fluridone.

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<u>Avg.</u>
Initial Ranking	15	22	3	2.3
Ranking as Revised	40	1	1	2.9

12-6 Summit Comments and Suggestions

- Develop this regardless of FRH.
- This is already happening. It is redundant? Continue to develop.
- In view of increased research efforts and potential new tools

4. Minimize Non-Target Impacts on Fish and Wildlife Habitat. Hydrilla management actions should aim to keep non-target impacts to a minimum because non-target impacts of hydrilla control measures on native plants could greatly reduce available fish and wildlife habitat. Where control of resistant hydrilla is limited because of budgetary considerations and/or insufficient selective management tools and where hydrilla coverage is not impacting the designated uses of a lake, immediate hydrilla control may not be necessary. Where water level manipulations are needed to improve the efficiency of hydrilla controls, aquatic plant management plans should consider the impacts of water level changes on fish and wildlife populations.

4. Minimize Non-Target Impacts on Fish and Wildlife Habitat. Hydrilla management actions should aim to keep non-target impacts to a minimum because non-target impacts of hydrilla control measures on native plants composition and abundance could greatly reduce available fish and wildlife habitat. Where control of resistant hydrilla is limited because of budgetary considerations and/or insufficient selective management tools and where hydrilla coverage is not impacting the designated uses of a lake, immediate

hydrilla control may not be necessary. ~~FDEP should consider allowing some hydrilla to persist.~~ Where water level manipulations are needed to improve the efficiency of hydrilla controls ~~with Fluridone~~, aquatic plant management plans should consider the impacts of water level changes on fish and wildlife ~~bird~~ populations.

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<u>Avg.</u>
	1	28	3	1.9

12-6 Summit Comments and Suggestions

- Allowing hydrilla to persist would require statute changes? “Maintenance control” doesn’t mean eradication under current law. “Lowest feasible level determined by FDEP”
- Based on available techniques and funding
- Justification not part of the ranking

Following the discussion and revisions made above no exit ranking was taken of the recommendation since no one expressed any serious remaining concerns.

VI. WILDLIFE AND FISHERIES MANAGEMENT

A. Comments on Survey Results

Mark Hoyer provided an initial overview of the results from the pre-Summit survey in each section under chemical management practices for hydrilla. Participants were then offered an opportunity to ask questions or provide additional comments.

Comments or questions:

- As an overall note, there is disagreement over the extent of detriment caused by hydrilla to fish and wildlife.

B. Overall Draft Common Problem Statement

As Revised

Hydrilla control can have potential positive and negative impacts on fish and wildlife depending on the unique characteristics of the system. Integrated objectives for hydrilla management and fish and wildlife in lake systems have not been clearly defined and agreed to by managers.

Initial Common Problem Statement

~~Aquatic plant and fish and wildlife managers must work together to interpret the research and balance hydrilla management and wildlife and fisheries goals and other lake uses in lake systems.~~

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<i>Avg.</i>
Initial ranking	2	26	4	1.9

12-7 Summit Comments and Suggestions

- This isn't a problem statement?
- Concern regarding what "integrated" suggests in terms of current practice

Revised Common Problem Statement

Hydrilla control can have potential positive and negative impacts on fish and wildlife depending on the unique characteristics of the system. Integrated objectives for hydrilla management and fish and wildlife in lake systems have not been clearly defined and agreed to by managers.

Acceptability Ranking:	<u>3</u>	<u>2</u>	<u>1</u>	<i>Avg.</i>
Ranking as Revised	1	38	6	1.9

Given the limited progress on revising the problem statement and the time left for discussion, participants chose to direct their attention to the remaining recommendations.

C. Recommendations

1. Minimize Non-Target Impacts Recommendation. Hydrilla management actions should aim to keep non-target impacts to a minimum because non-target impacts of hydrilla control

measures on native plants could greatly reduce available fish and wildlife habitat. Where control of resistant hydrilla is limited because of budgetary considerations and/or insufficient selective management tools and where hydrilla coverage is not impacting the designated uses of a lake, immediate hydrilla control may not be feasible. Where water level manipulations are needed to improve the effectiveness of hydrilla controls, aquatic plant management plans should consider all impacts of water level changes.

1. Minimize Non-Target Impacts Recommendation. Hydrilla management actions should aim to keep non-target impacts to a minimum because non-target impacts of hydrilla control measures on native plants ~~composition and abundance~~ could greatly reduce available fish and wildlife habitat. Where control of resistant hydrilla is limited because of budgetary considerations and/or insufficient selective management tools and where hydrilla coverage is not impacting the designated uses of a lake, immediate hydrilla control may not be feasible necessary. ~~FDEP should consider allowing some hydrilla to persist.~~ Where water level manipulations are needed to improve the effectiveness ~~efficiency~~ of hydrilla controls ~~with Fluridone,~~ aquatic plant management plans should consider all ~~the~~ impacts of water level changes. ~~on fish and wildlife bird populations.~~

Acceptability Ranking:	3	2	1	Avg.
Initial ranking	1	28	3	1.9
Ranking as revised	24	19	0	2.6

12-7 Comments and Suggestions

- Allowing hydrilla to persist would require statute changes? “Maintenance control” doesn’t mean eradication under current law. “Lowest feasible level determined by FDEP”
- Based on available techniques and funding
- Justification not part of the ranking
- Consider all impacts

2. Maintenance Program for Water Bodies with Widespread Hydrilla Populations. On public water bodies with widespread hydrilla populations, FDEP and cooperators shall consider implementing a maintenance program using all available management options. The initial focus shall be on public access points, navigation and trails to maintain recreational use. In many aquatic systems hydrilla constitutes the vast majority of remaining submersed vegetation. Therefore, while goals are to maintain native submersed plants, aquatic plant managers will be faced with recognizing hydrilla as a constituent of the submersed vegetation community.

On public water bodies with widespread hydrilla populations, FDEP and cooperators shall consider implementing a maintenance program using all available management options ~~registered contact herbicides and/or mechanical harvesting on water bodies with fluridone resistant hydrilla.~~ The initial focus shall be on public ~~and private~~ access points, navigation and trails to maintain recreational use. ~~If there are funds available after access allocations, FDEP will set as the working objective of maintaining submersed plant coverage above 15% of the water body’s surface area. FDEP unless advised differently by the working group establishing the lake~~

~~management plan shall not attempt to manage submersed vegetation coverage below 15% of the water body's surface area, especially on large lakes where the submersed vegetation is the vast majority of fish habitat.~~ In many aquatic systems hydrilla constitutes the vast majority of remaining submersed vegetation. Therefore, while goals are to maintain native submersed plants, aquatic plant managers will be faced with recognizing hydrilla as a constituent of the submersed vegetation community.

Acceptability Ranking:	<i>3</i>	<i>2</i>	<i>1</i>	<i>Avg.</i>
Initial ranking	3	28	13	1.4
Ranking as Revised	31	7	2	2.7

12-7 Summit Comments on Revised Statement- 2nd rank

- Anglers concern – want more explicit assurances in a % for maintaining fish habitat for anglers. Could be both native and hydrilla
- Problem with “trails”?
- What is the linkage to fish and wildlife? Is this misplaced in this section? Integrated management section?
- Concern with % and basis for this related to water body. What about native plant coverage, needs of lake?
- If a relatively un-impacted lake, then there may be a problem with 15% coverage.

VII. REFLECTIONS AND NEXT STEPS- Bill Torres

At the conclusion of the Summit FDEP thanked the Summit participants and agreed to review and develop a plan for implementing recommendations from the Summit. FDEP also agreed to place the Summit report to be compiled by the facilitators on its web site and disseminate the Summit report to the participants.





Summit participants at the beginning of the of the first day

Appendices

1. Summit Agenda
2. Summit Participant Evaluation Summary
3. List of Participants Attending
4. “Bin”- List of Issues Noted but Not Discussed
5. Summary of Survey Results
6. Recommendations from the June, 2005 Hydrilla Management in Florida Report based on the Hydrilla Management meeting, December, 2004
7. FDEP Current Status Report (Jeff Schardt)

Appendix #1
HYDRILLA MANAGEMENT SUMMIT
ORLANDO, FLORIDA
DECEMBER 6-7, 2005

DRAFT AGENDA

Tuesday, December 6, 2005

8:30 Registration

9:00 WELCOME AND INTRODUCTIONS- Bill Torres, Chief, Bureau of Invasive Plant Management, Florida Department of Environmental Protection

9:10 MEETING OBJECTIVES, FORMAT AND GUIDELINES FOR PARTICIPATION- Facilitators Bob Jones and Hal Beardall

9:30 PROGRAM STATUS OF HYDRILLA MANAGEMENT - Jeff Schardt, Florida Department of Environmental Protection, Bureau of Invasive Plant Management

- Status Report on Hydrilla in Florida public waters, December 2005

9:45 REVIEWING THE INTEGRATED MANAGEMENT PROBLEM STATEMENT

10:15 BREAK

10:30 TRIPLOID GRASS CARP REMOVAL TECHNIQUES- David Eggeman
Florida Fish and Wildlife Conservation Commission
FDEP Program Status- Jeff Schardt,

- Reflections on the Survey Results- Background and Problem, Potential Recommendation and Strategy

10:50 Review of the Background and Problem Survey Results

11:30 Review and Ranking of Recommendation and Strategies

- Plenary discussion of concerns and refinement of the recommendation and strategies
- Summary of areas of agreement and differences on strategies

12:30 LUNCH

1:30 CURRENT AND FUTURE CHEMICAL MANAGEMENT PRACTICES FOR HYDRILLA Michael D. Netherland US Army Engineer Research and Development Center

- FDEP Program Status- Jeff Schardt,
- Reflections on the Survey Results- Background and Problem, Potential Recommendations/Strategies.

1:45 Fluridone Resistant Hydrilla

- Review of the Problem Statement and Refinement of Potential Recommendation/Strategies

2:45 Endothall

Same as above

3:30 BREAK

3:45 Contact Treatment Strategies

Same as above

4:15 Use of Copper Based Products- Current State Policy

Same as above

- 4:45 Potential Development of Alternative Modes of Action**
Same as above
- 5:15 Development of Acetolactate Synthesis Inhibitors as an Alternative to Fluridone**
Same as above
- 5:45 Summary of areas of agreement and differences on strategies**
- 5:55 Review of Day Two Summit Agenda**
- 6:00 Recess**

Wednesday, December 7, 2005

- 8:00 REVIEW OF DAY ONE RESULTS AND DAY TWO AGENDA**
- 8:15 WATER REGULATIONS AND HYDRILLA MANAGEMENT ISSUES-**Jeff Schardt, Florida Department of Environmental Protections, Bureau of Invasive Plant Management
 - FDEP Program Status,
 - Reflections on the Survey Results- Background and Problem, Potential Recommendations
- 8:35 Plenary Review of Background and Problem Statement
- 9:00 Plenary Ranking of Potential Recommendations
Summary of areas of agreement and differences on recommendation
- 10:00 BREAK**
- 10:15 WILDLIFE AND FISHERIES MANAGEMENT,** Mark V. Hoyer, University of Florida, Department of Fisheries
 - FDEP Program Status- Jeff Schardt,
 - Reflections on the Survey Results- Background and Problem, Potential Strategies
- 10:35 Plenary discussion of concerns and refinement of the problem statement and strategies
 - Summary of areas of agreement and differences on recommendations
- 11:15 INTEGRATED LARGE-SCALE HYRILLA MANAGEMENT PLANS,** Michael D. Netherland US Army Engineer Research and Development Center
 - Reflections on the Survey Results- Background and Problem, Potential Strategies
- 11:50 Plenary discussion of concerns and refinement of the problem statement and strategies
 - Summary of areas of agreement and differences on recommendations
- 12:30 REFLECTIONS AND NEXT STEPS- Bill Torres**
- 12:55 SUMMIT EVALUATION**
- 1:00 ADJOURN**

**Appendix #2
HYDRILLA MANAGEMENT SUMMIT
ORLANDO, FLORIDA
DECEMBER 6-7, 23005**

SUMMIT EVALUATION SUMMARY

	<u>Agree</u>		<u>Disagree</u>		
	☺		☹		
	5	4	3	2	1
	<i>CIRCLE ONE</i>				
WERE THE SUMMIT OBJECTIVES MET?					
• To review and seek agreement on the background and problem definition for hydrilla management in Florida;	9	30	4	0	0=4.12
• To review and seek agreement on potential recommendations and strategies that can address the problems presented for Triploid Grass Carp removal techniques;	5	26	11	1	0=3.81
• To review and seek agreement on potential recommendations and strategies that can address the problems presented for current and future chemical management practices for hydrilla management;	6	24	11	1	0=3.83
• To review and seek agreement on potential strategies that can address the problems presented for water regulations and hydrilla management issues;	3	15	24	1	0=3.47
• To review and seek agreement on potential strategies that can address the problems presented for wildlife and fisheries management hydrilla management issues;	3	11	25	3	0=3.33
• To review and seek agreement on potential strategies that can address the problems presented for integrated large scale hydrilla management plans; and	4	10	20	8	1=3.19
• To clarify next steps.	3	11	20	6	0=3.28
SUMMIT ORGANIZATION					
• Survey materials and agenda packet were helpful	20	20	1	2	0=4.35
• Presentation format was effective	14	24	4	1	0=4.19
• Plenary Discussion Format was effective	13	19	9	2	0=4.00
• Facilitator(s) guided participant efforts effectively	21	19	3	0	0=4.42
• Participation by members was balanced	12	21	6	4	0=3.95

What Did You Like Best About the Meeting?

- The use of facilitators and trying to reach consensus!
- Having a moderator/facilitator that kept the meeting moving along. The unbiased figures worked great.
- Diverse and broad participant base
- Close to home
- Dissemination of information from various factions involved in Hydrilla Management and Control
- Open debate
- Interaction and review of state management actions and challenges of Hydrilla Control
- The ability to move issues along without dragging on too long on one subject
- Bring all interested parties together
- It was moderated very well. I think progress was made because of this
- Good participation from interested parties
- Stayed on task
- Good meeting, well conducted, especially with all the opinions in the group
- Well rounded opinions
- That we accomplish more than I thought we would considering our objective
- Open forum and kept organized and on track
- Good participation
- Moderators/facilitators were effective and kept schedule in mind.

What Could be Improved?

- No homeowners groups, sailing groups, other recreational groups represented
- Needed more time for several sections! Especially integrated control!
- Two days to complete program. Location – accommodation to fit group better
- More discussion of IPM and Biological Control
- Follow primary discussion more closely. It was made clear that there were some non-participants. However, these individuals were allowed to participate. Also, need to keep a tighter rein on discussion to stay focused
- Bigger room
- Better room atmosphere – too confined, felt like in a can of sardines. Too much clutter in the room. Noisy air-conditioning, people could not be heard.
- More focus on integrated management
- Open forum for other issues raised during summit
- Less word-smithing of recommendations and more focus on concepts

- Did not address some major issues of Hydrilla Chemical Control E.C. monitoring, copper, documentations, etc.
- Too much time spent on problem statements, and not enough time spent debating some of the more contentious issues
- Less paper. The packets were too distracting to have 3 or 4 different packets to look at. One packet with all of the information/data would have been better.
- More time
- Discussions unfocussed, should be more
- Breaks and lunches needed. Lost focus due to hunger
- Could we have split into subcommittees and covered more completely, the objective of the meeting. More review of the recommendation and the “bin” topics
- Printed material could be more concise and reduced
- How will suggestions be implemented? DEP by fiat?

Appendix #3 - Hydrilla Summit Attendees

<u>Name</u>	<u>Affiliation</u>	<u>Email Address</u>
Dave Ross	Syngenta	david.ross@syngenta.com
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Steve Cockrehan	SePro	stevec@sepro.com
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Jim Cato	UF/IFAS	jcato@ifas.ufl.edu
Dean G. Barber	Dept. of Environmental Protection	dean.barber@dep.state.fl.us
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Dean Jones	Polk County	deanjones@polk-county.net
Danielle Sobczak	Dept. of Environmental Protection	danielle.sobczak@dep.state.fl.us
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Bob Howard	SFWWMD	bhoward@sfwmd.gov
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Jeff Schardt	Dept. of Environmental Protection	jeff.schardt@dep.state.fl.us
Bill Torres	Dept. of Environmental Protection	william.torres@dep.state.fl.us
David Eggeman	Fish and Wildlife Conservation	donald.eggeman@myfwc.com
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Mark Heilman	SePro Corporation	markh@sepro.com
Bo Burns	BASF	burnsaj@basf.com
Joe Benedict	Fish and Wildlife Conservation	joe.benedict@myfwc.com
Terry Sullivan	Dept. of Environmental Protection	terry.sullivan@dep.state.fl.us
Robbie Lovestrand	Dept. of Environmental Protection	robert.lovestrand@dep.state.fl.us
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Appendix #3 continued – Hydrilla Summit Attendees

<u>Name</u>	<u>Affiliation</u>	<u>Email Address</u>
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Mark Abbott	SFWMD Contractor	mark.abbott@earthtech.com

Appendix #4

“Bin”- List of Issues Noted but Not Discussed Due to Limited Time

- What is “quality” habitat for FWC?
- What is “adequate native vegetation”?
- Carp selectivity in large systems- integrated management- other management tools need to be integrated.
- Forum/summit for establishing research priorities
- Copper toxicology as an area of research and consideration as a tool
- Hydrilla light attenuation (shading)
- Bring people together to focus on integrated management of all tools including bio control
- “The only good hydrilla is a dead hydrilla.”

Appendix #5 Pre-Summit Online Survey Summary

The summary results from the pre-summit online survey used to guide discussion during the two-day summit are available through the following link:

<http://consensus.fsu.edu/fhs-survey/index.html>

Appendix #6

Recommendations from the June, 2005 Hydrilla Management in Florida Report based on the Hydrilla Management meeting, December, 2004.

INTEGRATED PLANT MANAGEMENT

Integrating Mechanical or Biological Control Methods

Recommendation 1: Florida Department of Environmental Protection (FDEP) should begin establishing for each lake/aquatic system receiving significant State of Florida aquatic plant management funds an initial working group composed of senior FDEP and Florida Fish and Wildlife Conservation Commission (FWC) staff that is charged with developing a preliminary, written, aquatic plant management plan. Other appropriate state and federal agencies will be notified of the formation of this working group and those agencies will be allowed to determine whom among their staff are best qualified to provide input on the development of the plan. The plan must consider the principal or planned use of the water body, the optimum sustained use by the public of the water body's living aquatic resources, and/or sound biological management principals. The working group must utilize stakeholder input throughout the development of lake management plans. Finally, the working group shall also determine the historical level of hydrilla infestation, current status of the hydrilla, and technologies and funding available for control when determining the minimum feasible level of hydrilla. This must be done with the recognition that protection of human health, safety, and recreation are mandated by the Florida legislature when determining minimum feasible levels of hydrilla.

Justification: The Florida Department of Environmental Protection and the Florida Fish and Wildlife Conservation Commission are the two entities charged by the Legislature to manage aquatic plants throughout the state of Florida. Senior staffs from these two groups know the lakes, have extensive experience, and know other pertinent players at each lake. Senior staff of these agencies in conjunction with appropriate representatives from other local, state, and federal agencies has the best chance of coming up with a temporary yet workable lake management plan. These individuals also know the consequences of failure (i.e., legislative involvement) to their programs. Both the FLDEP and FWC have statewide responsibilities regarding hydrilla management, therefore, these two groups will be the most knowledgeable regarding the need for including Water Management Districts, the US Army Corps of Engineers, US Fish and Wildlife Service, County cooperators, and other groups with a stake in management policies regarding hydrilla.

CURRENT AND FUTURE CHEMICAL MANAGEMENT PRACTICES FOR HYDRILLA

A Basic Understanding Fluridone Resistance

Use of Fluridone for Control of Resistant Biotypes of Hydrilla

Endothall as a Chemical Alternative

Contact Treatment Strategies

Current State Policy on the Use of Copper-based Products

Potential Development of Alternative modes of action

The Development of Acetolactate Synthesis inhibitors as an alternative to Fluridone

Recommendation 3: Based on the extent of Fluridone resistant hydrilla (FRH), the identification and development of new herbicides for hydrilla control is critical. FDEP should immediately re-invigorate Florida's chemical research programs for aquatic plant management programs. FDEP should lead by obtaining needed state and federal funding (goal 10% of State of Florida's existing activities budget), and entering into agreements with universities, federal agencies or private entities for research and the development of new or improved aquatic plant control methods. In addition to the USEPA data requirements for the registration of a new product, a thorough evaluation of the efficacy and selectivity of a new herbicide will be critical prior to recommending its use on large public water bodies.

Justification: The inability to develop new tools for hydrilla control will result in further spread of FRH and this will greatly compromise the ability of the FDEP and its cooperators to manage hydrilla throughout the state. The best strategy for resistance management is the development of multiple tools that can be rotated. To conduct the appropriate research, funding is needed. FDEP provided research funding in the 1980s (FS 369.20(4)(b)) and the State of Florida got a good return on investment. Therefore, a good argument can be made to the Florida Legislature for increased research funding. As the largest purchaser of aquatic herbicides in the world, the FDEP and other end-users should make it clear to Industry that new tools would be welcomed and integrated in to their existing program. The increased reliance on endothall as the sole chemical alternative to fluridone may result in future problems with endothall efficacy. Finally, the addition of new aquatic products could provide enhanced benefits to the state for control of aquatic invasive species other than hydrilla.

Recommendation 4: There is a strong need to improve our ability to quantify the impact that fluridone or other lake management techniques are having on key non-target plant species. Methodologies for collecting reliable and useful field data need to be worked out between responsible agencies so results can be compared across both managed and unmanaged water bodies and sites treated at different fluridone use rates.

Justification: While increasing fluridone use rates does not pose a direct threat to non-plant organisms, the potential loss or severe reduction of a key individual plant species is a legitimate concern that requires improved data collection to support future decision-making. The bleaching symptoms following a fluridone application are quite visual, and conclusions on the ultimate impact to these native plants are often anecdotal and based on a bias regarding fluridone use for whole-lake management. There has been little or no quantitative assessment of the impact to native submersed and emergent vegetation following increased use rates of fluridone. While laboratory and mesocosm data for non-target native plants are currently being generated, these data need to be put in the context of actual field results. The FWC has conducted some initial field monitoring, but these efforts have generally been limited and have remained internal.

Recommendation 5: For sites where the hydrilla remains susceptible to fluridone, consecutive year applications are discouraged. It is also crucial that resistance

management strategies be developed to prevent FRH from developing a dual resistance to another mode of action.

Justification: Fluridone has proven its utility in providing large-scale hydrilla control, and a successful treatment should greatly reduce the need to conduct an application the following year. In situations where adequate control is not achieved, aquatic managers need to determine the basis for this reduced efficacy (e.g. increased herbicide resistance, loss of residues to flow, enhanced degradation). Based on the widespread coverage of FRH on the Kissimmee Chain of Lakes and several other large lake systems, it is apparent that sequential applications of fluridone can ultimately facilitate the lake-wide expansion of resistant biotypes. ALS chemistry represents a potential new tool that could be rotated with fluridone for control of susceptible hydrilla. In the case of FRH, management with an ALS herbicide will be complicated the fact that managers will be treating plants that have already developed a resistance to one mode of action. For sites already dominated by FRH, management strategies need to be considered to prevent development of a dual resistance to both fluridone and ALS inhibitors. This issue suggests that more than one new mode of action is needed for the long-term control of hydrilla.

Recommendation 6: In addition to considering rotation schemes with fluridone, aquatic managers also need a contact product that can be rotated with Aquathol. There are currently no new contact products being considered for registration. In order to provide a new tool that would be available for immediate use of combinations of products should be further evaluated. . We recommend that copper only be considered for hydrilla control when used in combination with the herbicide diquat or other registered herbicides. Research should be conducted to determine if low rates of products such as the dimethylalklyamine formulation of endothall or hydrogen peroxide can enhance the activity of diquat or endothall for spot control of hydrilla. As the treatment of new infestations is the top FDEP priority for hydrilla control, addition of a new contact product would provide a highly useful tool to address this priority.

Justification: Endothall is the only contact product in wide-scale use in Florida public waters, and this complete reliance on a single contact herbicide does not represent a good resistance management strategy. There are many cases where multiple applications of endothall are being applied in the same areas. In lieu of waiting for a new contact herbicide registration (this could be years away), aquatic managers are encouraged to support research that evaluates the use of combination products to provide enhanced control and the ability to rotate products.

Recommendation 7: When possible, intense but small-scale management of hydrilla is preferable to large-scale whole-lake management efforts. In the case of larger lakes, this requires a considerable commitment to surveillance, sound reporting of the exact locations and size of hydrilla infestations, rapid action, and aquatic managers who can make decisions on the optimal treatment recommendations for insuring that small infestations are not allowed to spread. This recommendation fits with the current priority list of the FDEP regarding intense management of new finds, and this strategy should be employed to delay the spread of hydrilla, especially resistant strains.

Justification: When practiced properly, this form of management most resembles the

highly successful water hyacinth maintenance control program and it represents the best use of limited state resources and manpower. Preventing the establishment and dominance of hydrilla in water bodies with abundant native vegetation is the best management practice both in terms of cost-effectiveness and selectivity. If hydrilla can no longer be controlled in this manner, then whole lake options should be considered. Experience suggests that once hydrilla has been allowed to cover a water body, it is likely that whole-lake management will be required for multiple years to keep the plants under control. This increases both the long-term cost and the likelihood of resistance development.

TRIPLOID GRASS CARP

Recommendation 2: Throughout the literature review, Grass Carp Symposium and the Hydrilla Issues Workshop, it is clear that if there was some cost-effective and selective method of removing grass carp from a lake system before complete eradication of submersed aquatic vegetation was accomplished, then triploid grass carp would be an excellent method of hydrilla control for large and small lakes. Therefore, we recommend making funds available for more research on new techniques for removing grass carp from lakes. Research on this and other methods may be expensive, but a successful method would pay great dividends to aquatic plant management in Florida Lakes. Comments on the first draft of this report echoed warnings from previous studies suggesting that if total elimination of aquatic vegetation is unacceptable, then the use of grass carp to control vegetation in large or small lakes should not be considered. However, if research provides an efficient method to remove grass carp from a lake, then it is recommended that this method be evaluated in a Florida lake requiring aquatic plant control.

Justification: With the onset of resistant hydrilla there are limited tools with which to manage large infestations of hydrilla that are cost effective and selective. Thus, increased use of grass carp will likely be a major alternative. Because of the fear of complete removal of submersed aquatic plants from lake systems, it is imperative that some means of predictably removing grass carp from systems be obtained.

WATER REGULATION SCHEDULES AND THE USE OF FLURIDONE

Introduction

Large Lake Situations

Hydrilla Control in Relation to Regulation Schedules for Water

Lake Specific Issues

Hydrilla as a Threat to Flood Control

Recommendation 8: A formal request will be made to appropriate Water Management Districts for a detailed response as to the threat hydrilla causes to flood control. This inquiry should include all water bodies where FLDEP Aquatic Plant funds are likely to be spent to reduce hydrilla. The response should include an engineering assessment of the amount and locations of hydrilla that could create an increased risk of flooding. Once such a response is formulated, aquatic plant managers can develop plans to insure that

hydrilla is managed in critical areas that represent an increased risk of flooding.

Justification: It was apparent from the workshop that the threat hydrilla poses to the flood control function of these lakes is not well understood. For FDEP to consider changing management practices on these lakes, there needs to be a clear understanding of the implications of leaving high levels of hydrilla in the system. While it was noted that mechanical measures are in place to deal with plants becoming lodged in the structure (track hoes or draglines), it was unclear if these plans take into account a large infestation.

Recommendation 9: As it is likely that new herbicides may require an extended exposure period, it is recommended that an assessment of regulation schedules take into account the improved economics and efficacy that reduced water levels and flow can afford. In lieu of deviation requests on a yearly basis, the impact of deviation requests every two or three years should be studied, including the impacts to fish and wildlife. The seasonality of treatments may be adjusted based on the ability to manipulate water levels/flow during various times of the year.

Justification: Resistance management plans will likely prevent sequential or back-to-back use of new products within these lakes. Therefore, when treatments are initiated, it is likely that we will be dealing with a significant hydrilla infestation, and it is important to provide optimal conditions to allow extended control of the hydrilla.

Recommendation 10: With the long-range viability of fluridone in large lakes with FRH in doubt, the FDEP, FWC and South Florida Water management District (SFWMD) need to develop long-term aquatic plant management plans for how, when, and where to manage hydrilla on the large flood control lake systems.

Justification: If the hydrilla infestations become more severe on these systems, increasing fluridone rates may not be a feasible option. It is important that priority zones for access, navigation, and habitat improvement are included in a lake management plan that does not include the use of fluridone.

WILDLIFE AND FISHERIES MANAGEMENT

Recommendation 11: Hydrilla management actions should aim to keep non-target impacts to a minimum because non-target impacts of hydrilla control measures on native plant abundance could greatly reduce available fish and wildlife habitat. Where control of resistant hydrilla is limited because of budgetary considerations and/or insufficient selective management tools and where hydrilla coverage is not impacting the designated uses of a lake, FDEP should consider allowing some hydrilla to persist. Where water level manipulations are needed to improve the efficiency of hydrilla control with Fluridone, aquatic plant management plans should consider the impacts of water level changes on fish and bird populations.

Justification: Research has found no evidence that a wide range of hydrilla coverage (15% to 85% coverage) represents a threat to wildlife and fisheries, and in most cases, hydrilla even provides beneficial habitat. However, high hydrilla coverage (> 85%) can cause problems for fisheries and hydrilla coverage greater than 40% to 50% generally cause problems with

recreational activities. Water-level manipulations in lakes have been shown to significantly influence bird and fish populations.

FLORIDA STATUTE AND FLORIDA ADMINISTRATIVE CODE

Recommendation 12: FDEP and cooperators shall consider implementing a maintenance program using registered contact herbicides and/or mechanical harvesting on water bodies with fluridone resistant hydrilla. The initial focus shall be on public and private access points and trails to maintain recreational use. If there are funds available after access allocations, FDEP will set as the working objective of maintaining submersed plant coverage above 15% of the water body's surface area. FDEP unless advised differently by the working group establishing the lake management plan shall not attempt to manage submersed vegetation coverage below 15% of the water body's surface area, especially on large lakes where the submersed vegetation is the vast majority of fish habitat. In many aquatic systems hydrilla constitutes the vast majority of remaining submersed vegetation. Therefore, while goals are to maintain native submersed plants above a certain percentage, aquatic managers will often be faced with recognizing hydrilla as a constituent of the submersed vegetation community.

Justification: The Florida Aquatic Weed Control Act states it shall be the duty of FDEP to manage plants so as to protect human health, safety, and recreation. Access and fishing are two important issues in each category mentioned by the Legislature. Access and fishing are also two areas that can draw public ire if not managed properly. Research has shown the probability of encountering an impacted fish population increases when aquatic plant coverage is below 15% or greater than 85%, thus providing a wide "window of opportunity" for managing plants and fishing. This is critical because with the development and spread of hydrilla resistance to fluridone, the existing funding and technology means fewer acres of hydrilla can be managed. Implementing a maintenance program as recommended can buy time until improvement in technology and funding can be achieved.

Recommendation 13: FDEP work with their cooperators (i.e., become the lead agency) to seek funding for the establishment of a comprehensive aquatic plant management plan at each lake requiring major amounts of state dollars for weed control. These planning efforts should directly incorporate stakeholder concerns and directions for management.

Justification: Participants in the Hydrilla Issues Workshop acknowledged throughout the meeting that what is "done" depends upon having a lake management plan. FDEP is mandated by the Florida Legislature to guide and coordinate weed control activities on all public waters (FS 369.20(3)). Because aquatic plants affect water quality and FDEP works with FWC on plant/fish management problems, FDEP is a logical state agency to lead the long-term effort to get a workable lake management plan for each lake requiring aquatic plant management. FDEP is also the state agency best positioned with the Legislature to ask for funds for the development of a comprehensive aquatic plant management plan because FDEP and the water management districts have developed similar surface water improvement plans (SWIM) for Florida.

Appendix #7

CURRENT STATUS, December, 2005

Jeff Schardt, Florida Department of Environmental Protections, Bureau of Invasive
Plant Management

PROGRAM STATUS OF HYDRILLA MANAGEMENT IN FLORIDA (in relation to Sections II – VI of the Online Survey)

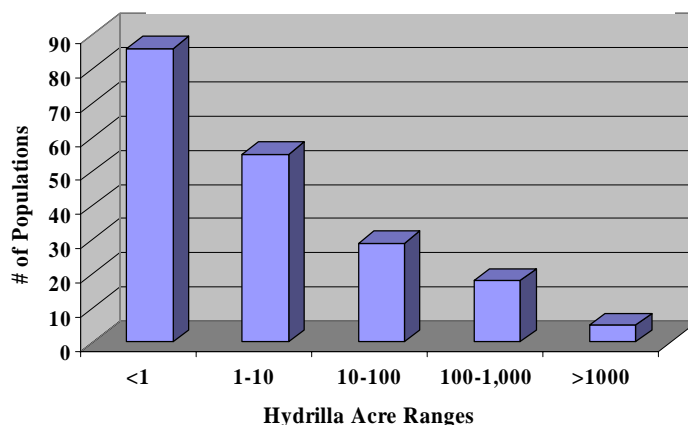
HYDRILLA STATISTICS – 2004 (2005)

(Note: 2004 stats presented at the summit – 2005 stats since have become available and are in parentheses)

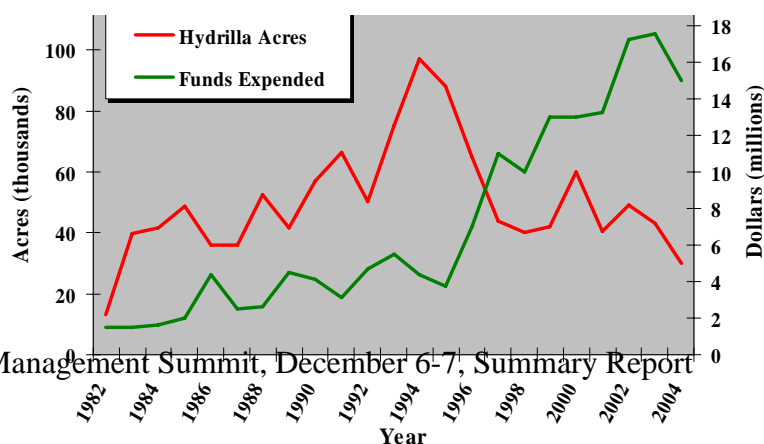
- Found in 193 (195) of 450 public waters - down from 280 infested
- 92,000 (88,900) acres infested with tubers - down from high of 140,000 (1994)
- 30,000 (20,400) acre standing crop - down from 100,000 acres (1994)
 - From control operations and hurricane impacts (wind – waves)
 - Hurricane impacts retarding regrowth (tannins – turbidity – blooms)
- 135 (141) hydrilla populations w/ standing crop <10 acres
- 13 (19) hydrilla populations with standing crop >100 acres
 - Historically, 17 waters with hydrilla populations >1,000 acres (5 in 2005)
- Hydrilla control statistics since 1981
 - 312,000 acres of hydrilla controlled
 - \$174 million spent in public waters

HYDRILLA PRESENCE IN FLORIDA PUBLIC WATERS

Hydrilla Population Ranges - 2004



Funding vs. Hydrilla Acreage - 1981-2004



CRITICAL ISSUE – TRIPLOID GRASS CARP (SECTION II OF THE ONLINE SURVEY)

Recommendation #2

- FDEP and FWC consult prior to stocking triploid grass carp in public waters
- Triploid grass carp are stocked in ~75 public waters
- Three basic considerations
 1. Stocking rate
 - 1-2 fish per acre preferred
 - Stock for new hydrilla infestations
 - Lower hydrilla biomass with herbicides – before/after stocking
 2. Containment
 - Physical barriers
 3. Removal
 - How to reduce numbers if overstocked
 - Methods tried include:

Seining	Electrofishing
Rotenone water	Bow hunting
Rotenone pellets	Bounty
Drawdown	Explosives

Discussion points:

- Differing results in large vs. small waters – 5,000 acres and over
- Containment barriers not resolved for large flood control reservoirs – electric barriers?
- What removal methods should be tested or revisited?
- Grass carp are not selective and may consume native plants before they can be removed.
- Of the 75 waters stocked with triploid grass carp are there significant success or failure examples to draw upon for future stocking evaluation.
- How many lakes have been stocked at 1-2 grass carp per acre to control hydrilla and have these stockings been considered successful? (control hydrilla – leave native plants)

CRITICAL ISSUE – CURRENT AND FUTURE MANAGEMENT PRACTICES FOR HYDRILLA (SECTION III OF THE ONLINE SURVEY)

Recommendation #3 – Research funding

- Since 1981, DEP has spent \$174 million controlling 312,000 acres of hydrilla in public waters
- Since 1970, DEP funded \$6.7 million for hydrilla physiology and control research.

Biological	\$4.2M
Chemical	\$1.5M

Other (Physiology) \$1.0M

DEP-funded hydrilla control research projects since 2001:

Years	Funds Spent	Project Title
01-03	\$186,773	Determination of the scope and physiological basis for fluridone tolerant hydrilla in Florida - UF
02-03	\$18,353	Monitoring establishment, distribution, and impact of two biological control agents on hydrilla - UF
03-06	\$117,150	Biological control of hydrilla - USDA
04-06	\$59,839	Integrated weed management strategies for control of hydrilla (MT & herbicides) - USACE
04-06	\$44,443	Evaluation of new herbicides for hydrilla control - UF
04-06	\$60,005	Evaluation of a potential new aquatic herbicide (SP-1019) to control fluridone-tolerant hydrilla - USACE
05-06	\$25,047	Selectivity of EUP and other potential new hydrilla herbicides - UF
05-06	\$21,000	Foreign exploration for natural enemies of Hydrilla verticillata in East Africa - UF

FDEP annual management budgets:

FY 2004-2005	Aquatics - \$29.7M	Uplands - \$8.3M	Total - 38.0M
FY 2005-2006	Aquatics - \$30.0M	Uplands - \$8.3M	Total - 38.3M

- FDEP has research agreements with the USDA, USACE, FAU, FSU, and UF

Discussion points:

- Should research be funded on a percent or dollar basis?
- What is an appropriate amount to dedicate to annual research funding?
- Should education, outreach, and research all be funded from this amount?

Recommendation #4 – Non-target impacts

- Non-target impacts have been studied in the lab and observed during operations for years and are the basis for hydrilla management plans
- Research is ongoing to determine native plant impacts from increased fluridone concentrations
- Non-target impacts have been researched for several submersed and emergent plants
- Many plants are being evaluated for impacts from fluridone and new ALS herbicides

Discussion points:

- Suggestions for additional native plants to evaluate for impacts from increased fluridone concentrations.

Recommendation #5 – Herbicide rotation schemes - fluridone

- SePRO is drafting fluridone rotation plan for agency review
- Currently FDEP is not using fluridone herbicide in same locations on consecutive years
 - Initiated 2005
 - Attempting to delay need for fluridone by more aggressive small-scale hydrilla control
- Early detection – rapid response with endothall
- Stock triploid grass carp where appropriate – at low rates
- Treat small hydrilla surface mats in water deeper than 2 feet to slow spread
- Evaluate lowest copper chelate rates with diquat for hydrilla efficacy

Discussion points:

- What other herbicides can be rotated with fluridone?
- Should allowing hydrilla to grow unmanaged for a year be considered?
 - Hydrilla will be much harder to control if mature stands develop.
 - What uses and functions could it harm?
- If fluridone tolerant hydrilla grows to mature stand, are large-scale control methods available?

Recommendation #6 – Aquathol rotation

- Aquathol K and Super K are used primarily on small-scale hydrilla control
 - Spot treat – up to 500 acres
 - Treating in cool water is preferable
- USACE testing / monitoring efficacy and duration of control of November-January treatments
- Two locations where repeated Aquathol use showing diminishing control
- Diquat and copper used only to spot treat in boat basins and at ramps
- Testing diquat + lowest feasible rates of copper chelate

Discussion points:

- What other herbicides can be rotated with aquathol on a spot treatment – 500 acre scale?

Recommendation #7 – Intense small-scale hydrilla management

- FDEP initiated early detection and rapid response to controlling hydrilla in 1990s
 - Eradicate new infestations
 - Prevent small populations from becoming large maintenance programs
 - Hydrilla has infested as many as 280 FL public waters since 1982
 - Hydrilla found in 193 waters in 2004

- Immediately control new hydrilla infestations at boat ramps
 - Aquathol
 - Diquat and copper
 - Grass carp
- SJRWMD and others routinely inspect Harris Chain of Lakes and Apopka for hydrilla
 - Report sightings to Lake County or SJRWMD for immediate control
 - Spot treatments to as much as 250 acres per treatment
 - Control hydrilla off water surface – poor light penetration limits re-growth
- Don't control hydrilla bands in waters shallower than 2 feet unless part of eradication
 - Re-grows within 1-2 months
 - Multiple treatments expensive - may lead to resistance or enhanced microbes?
- 2004 hurricanes tore up hydrilla and stirred up water – little hydrilla re-growth
 - Light probably limiting hydrilla growth – tannins – turbidity – algae
 - Controlling hydrilla when it reaches surface in spots and as much as 250 acres

Discussion points:

- **Management dilemma:** FDEP is charged with the statutory responsibility to control invasive aquatic plants at the lowest level to minimize environmental and economic harm. Aggressive management while hydrilla is at low levels may save tens of millions of control dollars and conserve attributes like flood control, water storage, and some of the recreational functions, but may also impact the world-class bass fishery and water fowl hunting on the lakes. There is little submersed vegetation standing crop – native or invasive hydrilla - in many of the large central Florida lakes and reservoirs. Some profess leaving hydrilla to support fish and wildlife in the absence of native plants cover. If, by allowing fluridone-resistant hydrilla to expand and it again reaches levels requiring large-scale management, we may not have tools available to control it without impacting native submersed and emergent vegetation.

CRITICAL ISSUE – WATER REGULATION SCHEDULES AND THE USE OF FLURIDONE (SECTION IV OF THE ONLINE SURVEY)

Recommendations #8, #9, #10, #11 – Hydrilla threat in reservoirs used for flood control – Water schedules – Management plans – Non-target impacts

- Water and plant managers from FDEP, SFWMD, and USACE met in September 2005 to discuss:

- Densities and locations of hydrilla in Kissimmee Chain of Lakes and Lake Istokpoga that may pose flood or water storage problems
- FDEP willing to assist in funding or modeling above project
- FDEP drafting letter to USACE regarding above project
- FDEP participating in long-term Kissimmee Chain of Lakes water level assessment to:
 - Identify windows of opportunity to accommodate hydrilla control
 - Lower water levels and discharge
 - Compatible with other uses and functions of the lakes and downstream
 - Participated 2+ years so far
 - Process is ongoing with 2007 implementation date
- No process for Lake Istokpoga water schedule review to accommodate hydrilla control
- Water schedule deviation request for 2005 denied – kites, irrigation, recreation
- Treating at 25ppb fluridone at full pool may be cost prohibitive
- Cost too high to treat at or near full pool
- Discharge at full pool flushes too much fluridone
- ALS application and exposure requirements similar to fluridone
- Irrigation a concern when treating at full pool
- No water storage to buffer against rainfall
- Treated water flushed downstream – especially problem in Istokpoga
- Carbon treatments can inactivate fluridone if discharged to irrigation
 - Expensive
 - Works for fluridone - not understood for ALS inhibitors

Discussion points:

- Currently there are only five reservoirs with water schedules regulated by the USACE with large-scale fluridone-resistant hydrilla, but they represent more than half of the state's hydrilla standing crop and more than half of hydrilla control expenditures. (Toho, Cypress, Hatchineha, Kissimmee, Istokpoga)
- Should more aggressive hydrilla control be applied to delay need for large-scale control?
- Can we regain control if FRH covers the surface of most of these lakes?
- Will intentionally leaving unmanaged hydrilla for fish and wildlife habitat accelerate the spread and need for large-scale hydrilla control?
- At what point would hydrilla be managed – especially depth, growth stage, location?
- What would a more aggressive hydrilla management plan entail – especially methods?

CRITICAL ISSUE – WILDLIFE AND FISHERIES MANAGEMENT (SECTION V OF THE ONLINE SURVEY)

Recommendation #12 – also #11 – Hydrilla and management impacts of fish and wildlife

- FDEP statutory responsibility to maintain invasive aquatic plants at lowest feasible level
- All aquatic plant management plans are reviewed and commented on by FWCC
- Management plans are forwarded to USFWS for endangered species input
 - Snail kites
 - Manatee aggregation areas
- Some local governments and water management districts participate in plant management and developing management strategies
- Researchers and herbicide company technical support personnel are consulted to develop plant management strategies
- Some citizen and association interaction where interested and informed on issues
- Request to leave a percentage of invasive plants has been discussed for decades
 - Hydrilla – water hyacinth – water lettuce
- A percentage of surface matted hydrilla reduces fish habitat – adds food source for some water fowl
 - Leaving hydrilla at surface increases opportunities for hydrilla expansion
- Surface matted hydrilla is much more difficult to control than when in early growth stages
- Hurricanes have reduced native submersed plant cover and hydrilla represents the only submersed plant for fish and wildlife habitat in some large public waters

Discussion points:

- Is it good management practice from an economic and environmental perspective to intentionally leave large acreages of invasive plants unmanaged?
- Is it good management practice from a fisheries perspective to leave large-scale hydrilla populations one year and control as low as possible the next? “Boom and Bust” – Good for fishery or good for anglers?
- Where would hydrilla be left unmanaged and why?
- How would leaving unmanaged hydrilla be reconciled with affected public? (Not in my back yard)
- What are the negative impacts to fish and wildlife from dense hydrilla surface mats?
 - Apple snail survival
 - Kite access to apple snails
 - Stunting sportfish populations
 - Oxygen depletion and fish kills
- Are channeled apple snails having an impact on hydrilla? Or other vegetation?

INTEGRATED HYDRILLA MANAGEMENT (SECTION VI OF THE ONLINE SURVEY)

There was much discussion at the end of the December 2004 Hydrilla Issues Workshop directing the Department to integrate various existing aquatic plant management technologies into Florida's hydrilla control program. The Hydrilla Issues Workshop was held to alert resource managers of the increasing difficulties conducting large-scale hydrilla control with increasing fluridone resistance and enhanced microbial degradation of fluridone in some waters before it can effectively control hydrilla. More than 25 different hydrilla management tools are incorporated into Florida's aquatic plant management program and they are listed below.

Some consider integrated hydrilla management as applying all available options while others consider all options and apply one or more that fit the best with current conditions. As outlined in the Department's Annual Report, the Department integrates several basic components listed below into hydrilla management programs:

- Uses, functions, and current conditions of the water body and downstream attributes
- Multiple management tools – consider all available tools and select best fits
- Biology and life cycles of invasive and non-target species – best conditions to control
- Water body sensitivity to invasion by hydrilla – will hydrilla be a problem?
- Management impacts on ecosystems – select best fits
- Reduce hydrilla impacts below an economic or ecological harm threshold
- Flexibility to adapt management techniques to changing conditions
- Continual assessment and development of current and additional control options

Large-scale hydrilla management programs are integrated among the following uses, functions and conditions.

Water Uses	Control Feasibility	Physicochemical Considerations
Navigation	Potential for control	Water movement
Commercial	Available methods	Water depth/volume
Public	Static vs. flowing waters	Water body size/configuration
Flood control	History of success	Oxygen level
-Drinking	Restoration/recovery potential	Substrate composition
-Irrigation	Cost	Water temperature
Recreation	Public/agency support	Light penetration
-Boating		Wind and waves
-Fishing/hunting	Other Considerations	
-Water sports	Trophic state	Biological Processes
-Wildlife observation	Water body class	Susceptibility
Wildlife Management	Population proximity	Fish and wildlife
Endangered species	Alternate waters	Plant growth stage
Fisheries management	Values at risk	
Waterfowl management		

Hydrilla control options available for use in Florida public waters and application status:

Biological controls

- *Hydrellia balciunisii* – released – did not establish
- *Hydrellia pakistanae* – wide dispersal – no observed impacts in FL – needs further evaluation
- *Baguous affinis* – released – did not establish – needs drawdown to feed on tubers
- *Baguous hydrillae* – released – did not establish – needs sandy shorelines
- *Ctenopharyngodon idella* – stocked in more than 75 Florida public waters
- *Micoleptodiscus terrestris* – under review in combination with herbicides
- *Cricotopus lebetus* – under review - hydrilla control activity in spring runs?

Chemical controls

- Copper compounds – spot treatments - used if alternatives are not available
- Primarily use liquid copper chelates - copper sulfate is not used for hydrilla control
- Under review - lowest effective copper rates to use in conjunction with diquat
- Diquat – tested ineffective by itself even at .37ppm – use with copper for spot treatments
- Endothall
- Aquathol K and Super K used extensively for:
 - Spot infestations and plots up to 500 acres
 - Pre fluridone treatments to control surface-matted hydrilla
 - Post fluridone treatments to touch up uncontrolled hydrilla
 - During some fluridone resistant hydrilla treatments - enhanced effects
- Hydrothol 191 and Hydrothol 191 granular rarely used – low rate with Aquathol
- Fluridone – most often used herbicide
 - Mostly whole-lake or large-scale treatments
 - Occasional spot treatments in quiet, protected waters
 - 3 pellet formulations with various release rates – 1 liquid formulation
 - Used in conjunction with testing to:
- Estimate lethal concentration for hydrilla in each water body for each treatment
 - Determine water volume to apply appropriate amount of active ingredient
 - Monitor and maintain fluridone concentration during treatment
 - Monitor hydrilla reaction to fluridone exposure
 - Under review – 3 ALS inhibitor compounds – 24(c) Special Local Needs - Section 18 Emergency Exemption - EUP Experimental Use Permit

Cultural controls

- Hand pulling – infrequent - for new populations or in fast flowing spring runs
- Diver dredge – one spring run
- Silt curtains – infrequent – in spring runs to divert flow – used with herbicides
- Drawdown – infrequent – lower water volume and discharge - less herbicide, increase efficacy

- Flooding – infrequent – raise water level after herbicide applications to further stress hydrilla

Environmental controls – take advantage of environmental conditions

- Algae blooms, tannic, or turbid waters decrease light penetration and stress hydrilla
- Storms tear hydrilla from sediments

CRITICAL ISSUE – INTEGRATED PLANT MANAGEMENT (SECTION VI OF THE ONLINE SURVEY)

Recommendation #1 and #13 - Management Plans

- FDEP is responsible for controlling plants in 460 public water bodies
- Each year, plants are controlled in ~350 waters
- Develop annual workplans for each water body in which plant control is anticipated
 - Plans developed among managers from various agencies
 - Public invited / attend if interested / informed
 - General plan to pre-approve funding, plants that may need control and methods
 - Plans incorporate
 - Uses and functions of water body
 - Biological, weather, hydrology, physicochemical, conditions
 - Agencies affected
- Hydrilla control anticipated in more than 230 waters in FY 05-06
 - Most are small-scale control operations
 - Approximately 10 waters with annual hydrilla control exceeding \$250,000
- All control operations must be reviewed by FWCC before implementation
- Other agencies or researchers consulted as conditions require
- Staffing and time are insufficient to develop detailed management plans each year that seek public acceptance
- Not necessary to develop individual water body plans for all hydrilla control
 - Section 369.22, Florida Statutes requires maintenance control
 - FDEP web sites explain why hydrilla is controlled and lists methods
- FDEP contract requires fluridone provider to draft hydrilla management plan for large-scale hydrilla control when fluridone is used

Discussion points:

- What constitutes significant hydrilla control funding?
- What level of public involvement should be sought?
- Who are stakeholders and what level of understanding of invasive species issues and control methodologies should be required to participate in annual management plan development?

- Should economic evaluations be conducted for each water receiving significant funding?
- No single large-scale operations in Harris Chain of lakes but many annual operations to prevent small infestations from becoming large contiguous hydrilla stands.