



ALABAMA POWER COMPANY

BIRMINGHAM, ALABAMA

MARTIN HYDROELECTRIC PROJECT

FERC NO. 349

STUDY PLAN 12 (B) – EFFECTS OF A RULE CURVE CHANGE ON SEDIMENTATION RATES AND NUISANCE AQUATIC VEGETATION

MARCH 2009

Prepared by:



**ALABAMA POWER COMPANY
BIRMINGHAM, ALABAMA**

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TABLE OF CONTENTS

1.0	GOALS AND OBJECTIVES OF STUDY.....	1
2.0	RELEVANT RESOURCE MANAGEMENT GOALS	1
3.0	BACKGROUND AND EXISTING INFORMATION	1
4.0	PROJECT NEXUS	4
5.0	STUDY AREA AND STUDY SITES.....	4
6.0	PROPOSED METHODOLOGY	4
7.0	CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE	4
8.0	PRODUCTS.....	4
9.0	SCHEDULE.....	4
10.0	LEVEL OF EFFORT AND COST	5
11.0	REFERENCES	5

STUDY PLAN 12 (B) – EFFECTS OF A RULE CURVE CHANGE ON SEDIMENTATION RATES AND NUISANCE AQUATIC VEGETATION

1.0 GOALS AND OBJECTIVES OF STUDY

Many stakeholder groups have requested that the Alabama Power Company (Alabama Power) investigate the feasibility of raising the winter rule curve at Martin. In Study Plan 12 (a), Alabama Power is proposing a study that will model an increase in the winter pool elevation in increments of 1 foot from el. 481 ft msl¹ to el. 486 ft msl (i.e., el. 482, 483, 484, 485, and 486 ft msl) as well as to examine extending the summer pool level in the shoulder seasons (raise the Lake to full pool earlier in the Spring and maintain full pool into the early/mid Fall). As a result of this modeling study, Alabama Power must address potential changes to sedimentation rates and resulting potential increase in nuisance aquatic vegetation if Lake Martin's winter rule curve is higher, and the summer pool duration longer, than existing operations.

By holding the lake higher during the winter, shallow water habitat would likely increase, which may have adverse impacts on the lake. The previous 10 ft winter drawdown helps control aquatic vegetation as it freezes the plants and tubers and reduces the chances of additional aquatic vegetation establishing in the lake.

The objectives of this study include:

- 1) identify areas susceptible to increased sedimentation and establishment of nuisance aquatic vegetation; and
- 2) develop a ranking system for these areas that describes the probability of increased sedimentation and establishment of nuisance aquatic vegetation at each proposed winter rule curve 1-ft elevation changes.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The consulting agencies regulate recreational fishing and water quality resources on Lake Martin. As part of that responsibility, they would like to identify areas of sedimentation in the lake; to identify areas that currently have or could potentially have nuisance aquatic vegetation; and to identify probability that each 1-ft elevation change in the winter rule curve change (elevation) and duration of summer pool may have on increases in nuisance aquatic vegetation.

3.0 BACKGROUND AND EXISTING INFORMATION

Project operations related to existing lake level fluctuations may result in areas of the shoreline that experience increased sedimentation. Presently, some of the sedimentation issues in the lake are mitigated each year through the 10 foot winter drawdown (*i.e.* winter and spring rains periodically remove sediment accumulations). This is evidenced by the low abundance and distribution of nuisance aquatic vegetation on Lake Martin. Agencies have a concern that

¹ Elevation 481 ft msl is equivalent to el. 480 Martin Datum (MD).

without the annual 10 ft drawdown, sedimentation may increase in certain areas on the Lake and increase the susceptibility of those areas to an increase in nuisance aquatic vegetation.

To view areas of sedimentation, LIDAR information and flyover photography are available for the project at winter pool. This information will be helpful in identifying areas that may have a high degree of probability of sedimentation. To detect areas of nuisance aquatic vegetation, Alabama Power will look at LIDAR data from the lake in 2007, soil data and land use, information from Alabama Power’s Aquatic Vegetation Control Group, and Alabama Power will also work with agencies to identify possible plants that could create a nuisance.

Alabama Power currently has an Aquatic Plant Management Program that is applicable to all of Alabama Power’s reservoirs. Aquatic vegetation is managed in compliance with local, state and federal laws and regulations to optimize all the uses of these reservoirs. Aquatic Plant Control is considered if the vegetation:

- Creates a potential public health hazard by providing mosquito breeding habitat;
- Poses a threat to power generation facilities or water withdrawal structures;
- Restricts recreational use of the reservoir; and/or
- Poses a threat to the ecological balance of the reservoir (such as may be the case of an aquatic plant which is known to create problems in the above categories).

Aquatic vegetation is left in its natural state in areas which do not meet the above criteria (as deemed appropriate by Alabama Power biologists and staff) to enhance fishery habitat and reservoir aesthetics. The extent of assistance to homeowners or corrective action initiated is determined by actual need and whether the control falls within the above categories.

Table 1 list the total acres of nuisance aquatic vegetation treated by Alabama Power from 2003 - 2007 on the Martin Project. Types of nuisance aquatic vegetation treated include emergent and floating species.

Table 1: Acres of Nuisance Aquatic Vegetation Treated on Lake Martin from 2003 to 2007

YEAR	ACRES TREATED	SPECIES AND LOCATION DESCRIPTION
2007	0 acres	
2006	3 acres – emergent	giant cutgrass - 3 acres of exposed river bank/sand bars in the upper lake downstream of Irwin Shoals.
2005	1.25 acres – emergent	torpedo grass - near Anchor Bay Marina
2004	0.5 acres - floating	spiny leaf / brittle naiad - treated on Lake Martin – location not recorded.
2003	0 acres	

Alabama Power’s aquatic plant control program is based on a maintenance control philosophy. Control measures are initiated before noxious weeds reach a problematic stage. Once weeds reach the problematic stage, it is difficult to return to the original maintenance level. This philosophy helps to minimize chemical applications and promote plant diversity. All aquatic plant control measures are directed by staff biologists certified as commercial aquatic applicators by the State of Alabama, Department of Agriculture and Industries. Only EPA approved aquatic herbicides are used in the aquatic plant management program.

Alabama Power’s aquatic plant control program is directed toward, but not limited to, species listed in the “Alabama Non-indigenous Aquatic Plant Control Act”. Table 2 presents the aquatic species that are prohibited from being introduced or placed or caused to be introduced or placed into public waters of the state of Alabama. In addition to these species, we will consult the Alabama Aquatic Nuisance Species Management Plan for additional species.

Table 2: Aquatic Vegetation Species Prohibited in State Waters of Alabama

COMMON NAME	SCIENTIFIC NAME
African elodea	<i>Lagarosiphon spp</i>
alligator weed	<i>Alternanthera philoxeroides</i>
Brazilian elodea	<i>Egeria densa</i>
curlyleaf pondweed	<i>Potamogeton crispus</i>
eurasian watermilfoil	<i>Myriophyllum spicatum</i>
floating waterhyacinth	<i>Eichhornia crassipes</i>
giant salvinia	<i>Salvinia molesta</i>
hydrilla	<i>Hydrilla verticillata</i>
hygrophila	<i>Hygrophila polysperma</i>
limnophila	<i>Limnophila sessiliflora</i>
parrot-feather	<i>Myriophyllum aquatica</i>
purple loosestrife	<i>Lythrum salicaria</i>
rooted waterhyacinth	<i>Eichhornia azurea</i>
spinyleaf naiad	<i>Najas minor</i>
water-aloe	<i>Stratiotes aloides</i>
water-lettuce	<i>Pistia stratiotes</i>
water-chestnut	<i>Trapa natans</i>
water spinach	<i>Ipomea aquatica</i>

4.0 PROJECT NEXUS

The Project is licensed by FERC and the proposed operational changes must be disclosed and affects on sedimentation and nuisance aquatic vegetation addressed in the license application to FERC.

5.0 STUDY AREA AND STUDY SITES

The study area includes all of the waters of Lake Martin. The study will identify areas most susceptible to increased sedimentation and potential for increased nuisance aquatic vegetation (i.e., creek mouths and shallow embayments).

6.0 PROPOSED METHODOLOGY

- 1) Identify areas susceptible to increased sedimentation and establishment of nuisance aquatic vegetation through the use of GIS analysis that incorporates LIDAR, soil types, and land uses to identify areas.
- 2) Develop a process to rank the areas in terms of its probability to experience increased sedimentation and establishment of nuisance aquatic vegetation at each proposed winter rule curve level, as described above.
- 3) Develop a report of findings, including maps, and distribute to the MIG 3 for review and comment.
- 4) Develop potential mitigation measures relative to each increment of change in winter pool elevation.

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

The planned study methods discussed above are consistent with typical sedimentation investigations and predictions of patterns associated with nuisance aquatic vegetation. These methods are also consistent with Alabama Power's current nuisance aquatic vegetation control plans.

8.0 PRODUCTS

Data and documentation of the analyses from this study including maps (both electronic and hard copy) will be included in the Preliminary Licensing Proposal. Any draft reports generated as part of this study will be distributed to the MIG 3 for review and comment.

9.0 SCHEDULE

This schedule corresponds to Alabama Power's Process Plan and Schedule filed with FERC on February 16, 2009. Actual consultation meeting dates will be determined with MIG 1 members upon FERC approval of the study plan.

Submit final study plan for FERC review and approval	March 2009
FERC Approval	April 2009
MIG 3 Consultation	April 2009 – December 2010
Initial Study Report.....	November 2009
Initial Study Report Meeting	December 2009
Conduct evaluations.....	July 2009 – January 2010
Distribute Draft Report	March 2010
FERC Updated Study Report	September 2010
Updated Study Report Meeting	September 2010

10.0 LEVEL OF EFFORT AND COST

Alabama Power estimates that consultation with the MIG 3 and analysis and reporting will cost approximately \$75,000.

11.0 REFERENCES

ALABAMA POWER COMPANY

MARTIN RELICENSING PROJECT

*Aquatic Nuisance Vegetation and
Vector Control Management Program Report*

December 2008

Prepared by:
Alabama Power Company

ALABAMA POWER COMPANY
BIRMINGHAM, ALABAMA

MARTIN RELICENSING PROJECT
AQUATIC NUISANCE VEGETATION AND VECTOR CONTROL MANAGEMENT
PROGRAM REPORT

1.0 EXECUTIVE SUMMARY 8

2.0 AQUATIC NUISANCE VEGETATION and vectors 9

3.0 AQUATIC PLANT MANAGEMENT PROGRAM 10

 3.1 Aquatic Plant Control 10

 3.2 Nonindigenous Aquatic Plants..... 11

4.0 MOSQUITO CONTROL PROGRAM 13

 4.1 Monitoring 13

 4.2 Source Reduction 13

 4.3 Homeowner Tips..... 14

 4.4 Larviciding..... 14

5.0 APPLICABLE LAWS 16

 5.1 Code of Alabama 16

 5.2 Alabama Administrative Code..... 17

**ALABAMA POWER COMPANY
BIRMINGHAM, ALABAMA**

**MARTIN DAM RELICENSING
AQUATIC NUISANCE VEGETATION AND VECTOR CONTROL MANAGEMENT
PROGRAM REPORT**

1.0 EXECUTIVE SUMMARY

The Alabama Power Company (Alabama Power) as part of its Martin relicensing process has prepared the following report describing current efforts to identify and control nuisance aquatic vegetation and vectors. This report serves as a baseline of information for stakeholders in the Martin relicensing process. Stakeholders should alert Alabama Power of any areas where the current management practices are not meeting expected or desired levels of control.

Alabama Power's Aquatic Plant Management and Mosquito Control programs are guided by the Public Health Laws of Alabama, the regulations of the Federal Energy Regulatory Commission (FERC) and Alabama Power's commitment to the public health and welfare of Alabama.

Any questions regarding Alabama Power's Aquatic Plant Management Program or Mosquito Control Programs or other requests for assistance may be directed to Environmental Affairs, Vector and Aquatic Plant Management at 1-800-Lakes-11.

2.0 AQUATIC NUISANCE VEGETATION AND VECTORS

Alabama Power complies with all state laws prohibiting the introduction and proliferation of nuisance species, which are defined as species that are unwanted or deemed harmful to local interests (see applicable laws section 5.0). Currently, Alabama Power participates in an Aquatic Plant Management Program to protect Lake Martin from the invasion of nuisance aquatic plant species. Alabama Power stays informed on all state and national issues related to nuisance species. Nuisance species found within project boundaries are evaluated for management actions on a case-by-case basis in consultation with the appropriate state resource agencies.

Alabama Power also participates in a vector control program that targets mosquitoes (Mosquito Control Program). A vector is any animal, in this case an insect, capable of transmitting a causative agent of human disease or capable of producing human discomfort or injury. Control of mosquitoes is accomplished on a case-by-case basis around Lake Martin.

3.0 AQUATIC PLANT MANAGEMENT PROGRAM

Aquatic vegetation in project reservoirs is managed in compliance with local, state and federal laws and regulations to optimize all the uses of these reservoirs.

3.1 Aquatic Plant Control

Aquatic control for Lake Martin from 2003 to 2007 is summarized in Table 3.1-1. Currently, there are three species of nuisance aquatic vegetation on Lake Martin that receive some level of control. They consist of two emergent grasses, one indigenous (native) species – giant cutgrass, and one nonindigenous species – torpedo grass. The third species is a nonindigenous floating species – spinyleaf/brittle naiad.

Table 3.1-2: Current Nuisance Aquatic Vegetation Control on Lake Martin

Year Treated	Acres Treated	Common Name	Scientific Name	Description	Approximate Location
2007	0	--	--	--	--
2006	3	giant cutgrass	<i>Zizaniopsis miliacea</i>	Indigenous emergent	3 acres of exposed river bank/sand bars downstream of Irwin Shoals.
2005	1.25	torpedo grass	<i>Panicum</i>	Non-indigenous emergent	Lake Martin near Anchor Bay Marina
2004	0.5	spinyleaf/ brittle naiad	<i>Najas minor</i>	Non-indigenous floating	Lake Martin – location not recorded.
2003	0	--	--	--	--

Alabama Power’s aquatic plant control program is based on a maintenance control philosophy. Staff periodically, at least annually, perform lake-wide surveys to identify areas of aquatic plant infestation. Control measures are initiated before noxious weeds reach a problematic stage. Once weeds reach the problematic stage, it is difficult to return to the original maintenance level. This philosophy helps to minimize chemical applications and promote plant diversity.

Alabama Power staff also reviews, on a case-by-case basis, requests from the public, state and federal agencies, and other Alabama Power employees to treat nuisance aquatic vegetation on Alabama Power reservoirs. Aquatic plant control is considered if the vegetation is shown to pose any of the following threats:

- Creates a potential public health hazard by providing mosquito breeding habitat;
- Poses a threat to power generation facilities or water withdrawal structures;
- Restricts recreational use of the reservoir; and/or
- Poses a threat to the ecological balance of the reservoir (such as may be the case of an aquatic plant which is known to create problems in the above categories).

In order to maintain fishery habitat and reservoir aesthetics, aquatic vegetation is left in its natural state in areas which do not meet the above criteria, as determined by Alabama Power biologists and staff. The extent of assistance to homeowners or corrective action initiated is determined by actual need and whether the control falls within the above categories.

The Aquatic Plant Management Program at Lake Martin is managed by Alabama Power staff that are trained and experienced in the control of nuisance aquatic vegetation. All aquatic plant control measures are directed by staff biologists certified as commercial aquatic applicators by the State of Alabama, Department of Agriculture and Industries. Only EPA approved aquatic herbicides are used in the aquatic plant management program.

3.2 Nonindigenous Aquatic Plants

Alabama Power's aquatic plant control program is directed toward, but not limited to, species listed in the "Alabama Nonindigenous Aquatic Plant Control Act" (see Section 5.2). Aquatic species that are prohibited from being introduced or placed, or caused to be introduced or placed into public waters of the state of Alabama are provided in Table 3.2-1.

Table 3.2-1 Non-indigenous Aquatic Plants Prohibited from the Waters of the State of Alabama

Common Name	Scientific Name
African elodea	<i>Lagarosiphon spp</i>
alligator weed	<i>Alternanthera philoxeroides</i>
Brazilian elodea	<i>Egeria densa</i>
curlyleaf pondweed	<i>Potamogeton crispus</i>
eurasian watermilfoil	<i>Myriophyllum spicatum</i>
floating waterhyacinth	<i>Eichhornia crassipes</i>
giant salvinia	<i>Salvinia molesta</i>
hydrilla	<i>Hydrilla verticillata</i>
hygrophila	<i>Hygrophila polysperma</i>
limnophila	<i>Limnophila sessiliflora</i>
parrot-feather	<i>Myriophyllum aquatica</i>
purple loosestrife	<i>Lythrum salicaria</i>
rooted waterhyacinth	<i>Eichhornia azurea</i>
spinyleaf naiad	<i>Najas minor</i>
water-aloe	<i>Stratiotes aloides</i>
water-lettuce	<i>Pistia stratiotes</i>
water-chestnut	<i>Trapa natans</i>
water spinach	<i>Ipomea aquatica</i>

4.0 MOSQUITO CONTROL PROGRAM

Alabama Power's Mosquito Control Program is based on best practice methods developed by the United States Public Health Service and the Tennessee Valley Authority and adopted by the World Health Organization, Center for Disease Control, American Mosquito Control Association and other agencies charged with developing mosquito control programs and training mosquito control personnel. These methods have been developed through extensive field studies that address monitoring techniques, source reduction, larviciding and adulticiding of mosquitoes to prevent nuisance levels that could affect the health and well being of lake residents and visitors.

4.1 Monitoring

Mosquito monitoring is carried out on all reservoirs to determine which mosquito species are present, if control measures are necessary, and if applied control measures are/will be effective.

The monitoring program at Lake Martin area control program consists of the following:

- Larval sampling – Mosquito larvae are collected from select permanent pools and floodwaters and identified to species.
- Adult resting stations – Resting stations are strategically placed near potential breeding sites, monitored during the mosquito breeding season, and then used as an index of permanent pool mosquito production.
- Light traps – A commercial adult mosquito capturing apparatus consisting of light, fan and collection jar is used to trap mosquitoes. They are typically used to identify nuisance species when there are extensive complaints in a specific area.
- Biting collections – An aspirator is used to capture mosquitoes that land on a collector for blood meal. Individuals are identified to species.

4.2 Source Reduction

Source reduction involves preventing the development of mosquito larvae and is an integral part of Alabama Power's mosquito control program. Since mosquitoes need water for development, the chief strategy in source reduction is eliminating sources of standing water that may provide an environment for mosquito egg-laying. Source reduction, where feasible, offers a permanent solution to mosquito problems by eliminating productive mosquito breeding habitat.

4.3 Homeowner Tips

Homeowners can help reduce mosquito populations through source reduction by eliminating breeding sites. The most common nuisance species on Lake Martin is *Aedes albopictus*, a container breeding mosquito that breeds in artificial sites with standing water such as tires, bird baths, folds of tarps, gutters, boats, and other receptacles. Alabama Power staff biologists are available to advise lake residents on how to identify and eliminate this and other important species of mosquitoes originating on their property. Among the actions a homeowner can take are the following:

- Discard containers and tires that hold water
- Promptly empty boats and canoes that fill with rainwater
- Eliminate pockets of rainwater within tarps
- Eliminate standing rainwater in drainage ditches
- Maintain good drainage in gutters and downspouts to prevent standing water
- Fill potholes in roads and other depressions that hold water
- Eliminate standing water in flower pot dishes
- Change water in birdbaths weekly

4.4 Larviciding

Where the elimination of breeding sites is not feasible, larviciding of productive mosquito breeding sites is initiated. Pre-emergent larvicides, applied to known mosquito habitat, prevent the emergence of adult mosquitoes. This method of control is site-specific, eliminating indiscriminate treatment of non-target species. Larvicides are applied by hand from all-terrain

vehicles and airboat by staff biologists certified as commercial applicators by the State of Alabama, Department of Agriculture and Industries. Larvicides used in project reservoirs are non-persistent in the environment and will not affect fish, waterfowl, mammals or beneficial predatory insects. Alabama Power does not perform broadcast spraying but treats complaints on a case-by-case basis. Currently, there are no pre-treatment sites on Lake Martin, which involves treating areas of standing water prior to identification of mosquito larvae. Also, historically it has not been necessary to treat for adult mosquitoes (adulticiding).

Larvicides currently used in the mosquito control program include the following:

- Aquabac – a highly selective bacterial insecticide consisting of a granular formulation of *Bacillus thuringiensis* var. *israelensis*,
- Bactimos – a bacterial insecticide consisting of granular and briquette formulation of *Bacillus thuringiensis* var. *israelensis*
- Altosid – granular and briquette formulation of methoprene, an insect growth regulator.
- Agnique MF – a biodegradable, monomolecular liquid film made from plant oils that forms a physical barrier and prevents emergence of adult mosquitoes.

5.0 APPLICABLE LAWS

Laws applicable to the control and management of nonindigenous aquatic plants are contained in the Code of Alabama Title 9, Chapter 20 as well as The Alabama Administrative Code, General Provisions Chapter 220-2. Relevant information for each law is provided below.

5.1 Code of Alabama

CODE OF ALABAMA TITLE 9. CONSERVATION AND NATURAL RESOURCES. CHAPTER 20. NONINDIGENOUS AQUATIC PLANT CONTROL ACT

Current through October 2002

§ 9-20-3. Introduction of nonindigenous aquatic plants in public waters prohibited.

Any person who introduces, places, or causes to be introduced or placed, any nonindigenous aquatic plant into any public waters of the state shall be in violation of this chapter. For purposes of this section, the unintentional adherence to a boat or boat trailer of a nonindigenous aquatic plant, and its subsequent unintentional transportation or dispersal in the course of common and ordinary boating activities and practices, does not constitute a violation of this chapter.

§ 9-20-4. Exemption for possession of nonindigenous aquatic plants.

Any person who possesses, through natural dispersion, and aquatic plant which is prohibited from being introduced or placed in a public water of the state pursuant to Section 920-3, and the possession posed neither danger or intent to further disperse the aquatic plant by means of transportation or other action, shall not be guilty of a violation of this chapter.

§ 9-20-5. Rules, regulations, or standards.

The department shall establish, adopt, promulgate, modify, repeal, or suspend any rules, regulations, or standards as necessary for the proper administration, implementation and enforcement of this chapter. The rules, regulations, or standards shall include, without limitation, a list of all nonindigenous aquatic plants which are prohibited from being placed or introduced into public waters of the state pursuant to Section 9-20-3.

§ 9-20-6. Penalties.

Any person who violates this chapter, or any rule, regulation, or standard adopted pursuant to this chapter, shall be guilty of a Class C misdemeanor and shall be punished in accordance with Sections 13A-5-7 and 13A-5-12.

5.2 Alabama Administrative Code

ALABAMA ADMINISTRATIVE CODE
ALABAMA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
GENERAL PROVISIONS CHAPTER 220-2. GAME AND FISH DIVISION

Current through October 2002

220-2-.124. Nonindigenous Aquatic Plant Regulation

For purposed of enforcement of Sections 9-20-1 through 9-20-7, Code of Ala. 1975, enacted by Act No. 95-767, as the “Alabama Nonindigenous Aquatic Plant Control Act”, the following list of all nonindigenous aquatic plants which are prohibited by Section 9-20-3 from being introduced or placed or caused to be introduced or placed into public waters of the state is established:

COMMON NAME	SCIENTIFIC NAME
African elodea	<i>Logarosiphon spp</i>
Alligatorweed	<i>Alternanthera philoxeroides</i>
Brazilian elodea	<i>Egeria densa</i>
Curlyleaf pondweed	<i>Potamogeton crispus</i>
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Floating waterhyacinth	<i>Eichhornia crassipes</i>
Giant salvinia	<i>Salvinia molesta</i>
Hydrilla	<i>Hydrilla verticillata</i>
Hygrophila	<i>Hygrophila polysperma</i>
Limnophila	<i>Limnophila sessiliflora</i>
Parrot-feather	<i>Myriophyllum aquaticum</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Rooted waterhyacinth	<i>Eichhornia azurea</i>
Spinyleaf naiad	<i>Najas minor</i>
Water-aloe	<i>Stratiotes aloides</i>
Water-lettuce	<i>Pistia stratiotes</i>
Water chestnut	<i>Trapa natans</i>
Water spinach	<i>Ipomea aquatica</i>