

# South Carolina ANS Pilot State Communications

## Final Report

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**South Carolina Department of Natural Resources  
International Association of Fish and Wildlife Agencies**



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## **I. Status of ANS within the agency prior to the pilot project**

South Carolina Department of Natural Resources (SCDNR) has been dealing with aquatic nuisance species (ANS) issues for more than 20 years, and next to Florida, has been implementing the most comprehensive ANS effort in the Southeast. Unfortunately, major budget cuts and staff reductions and reassignment forced SCDNR to reduce its ANS program to one-half of its original strength prior to and during the ANS pilot states communication project. While state legislation existed that addressed the introduction of nuisance aquatic plant and animal species, the agency has focused most of its efforts in managing aquatic plant problems as required by the Aquatic Plant Management Act.

SCDNR's Marine Resources Division is concerned with marine fish, shellfish (importation and recycling), shrimp, associated pathogens and ballast water discharge. The ballast water issue has tremendous impact on ANS efforts, but the Marine Resources Division doesn't have authority (U.S. Coast Guard and International Port Authority are primary stakeholders).

**Partnering relationships:** SCDNR has good relationships with other agencies involved with ANS. The establishment of the South Carolina Aquatic Plant Management Council in 1980 provided a forum for state agencies to regularly communicate and work together to address invasive aquatic plant problems. The agency has partnered with the U.S. Army Corps of Engineers since 1980 through their Aquatic Plant Control Program to share in the cost of control operations in public waters. An informal communication network between the DNR and Clemson University Extension Service provided a good mechanism for identifying aquatic plant problems and providing rapid response.

Internal ANS communication between the DNR divisions (Marine; Wildlife and Freshwater Fisheries; Law Enforcement; and Land, Water and Conservation) was casual at best and mostly issue driven. Regular discussions and points of contact were not established.

There are jurisdiction issues between the State Department of Agriculture and Clemson University Department of Plant Industry regarding the importation and sale of illegal aquatic plants.

**Education and training:** SCDNR has a good education outreach effort regarding invasive aquatic plants and zebra mussels through the state website, printed materials, boat ramp signs and manned displays at the Palmetto Sportsmen's Classic and Southeast Wildlife Exposition.

SCDNR also has a cooperative agreement with Clemson University's Department of Plant Industry regarding training of their plant nursery inspectors and enforcement of illegal aquatic plants from the State Plant Pest Act.

**Need for communications plan:** Prior to the pilot state project, SCDNR saw the need to develop a more cohesive communication plan that would include all ANS and unite partners. Leadership and staff believe an important part of prevention efforts is public education and outreach. SCDNR determined that being a pilot state would help with internal and external

communication efforts across the full spectrum of ANS issues. Communications efforts have gained emphasis and support after the positive experience of ANS planning as a pilot state.

## II. Summary of approach

### **Background on ANS issues in South Carolina**

The natural features of South Carolina provide a potential welcome mat for ANS. There are 750,000 acres of estuaries alone. In addition to estuaries, South Carolina has 750,000 surface acres of freshwater (over 1,600 lakes greater than 10 acres, 50,000 farm ponds, and 11,000 miles of rivers and creeks).

**Sport angling:** Surface waters support an active sportfishery in South Carolina. More than 1 million anglers participate with a total economic impact of nearly \$400 million annually. Many lakes host fishing tournaments, which attract anglers (and their boats) from throughout the country. Anglers from states that have established ANS populations are a likely source of invasion of alien weeds, bait fish and crayfish.

**Ports:** Every day, large quantities of ballast water from all over the world are discharged into U.S. waters along the coast of South Carolina and Georgia. Carried in this water are plants, animals, bacteria, and pathogens, ranging in size from microscopic to large plants and free-swimming fish. These organisms have the potential to become ANS, which may displace native species, degrade habitats, spread disease, and disrupt human social and economic activities. Any ship carrying ballast water is a potential invasion source. Ballast water issues generally fall under the authority of the U.S. Coast Guard.

SCDNR has identified two harbors as possible zebra mussel infestation sites:

The **Port of Charleston** is the *second* largest container port of the East and Gulf coasts, the *largest* on the Gulf and Southeast coasts, *fourth* in the nation and *thirteenth* in the world. Such ports provide numerous opportunities for ANS to enter estuaries through ship ballast water.

The **Port of Savannah** (Georgia) is located on a shared waterway with South Carolina. It is one of the fastest growing container ports in the country and currently ranks *sixth* among all U.S. container ports. The port was the nation's *eleventh* busiest waterborne freight gateway, and *twenty-fourth* for international trade by value of shipments in 2003. The Port of Savannah is a major point for imports from South and Central America and the Caribbean and for exports to Asian countries.

**Landscaping:** The influx of alien weeds continues to grow in South Carolina as landowners plant exotic plants for aquatic landscaping, affecting fish habitat, flow of irrigation water and boating access. The state recently fought off an outbreak of giant salvinia (*Salvinia molesta*), an aquatic weed native to Brazil that has spread rapidly in Louisiana and Texas.

**Zebra mussels:** More than 450 industries, public water suppliers, power generator facilities, aquaculture operations and golf courses withdraw more than 5 billion gallons of water per day from state surface waters. In 1993, concerns about zebra mussels led to formation of the South Carolina Zebra Mussel Task Force, which developed a statewide management and outreach strategy for zebra mussel prevention. To date, South Carolina has avoided zebra mussel invasion.

**Shrimp growing, non-native shellfish introductions and shell recycling:** These are key concerns for the Marine Resources Division. Before the ANS project started, the division already worked closely with shrimp growers, who are required to obtain a permit and maintain disease-free stocks. The division worked with this group, which did not involve the public at large.

Another concern is non-native shellfish (oysters and clams), the shells of which could be introduced from other states for seed for mariculture. There is great concern over the possibility of pathogens or other ANS hitch-hiking into South Carolina on shellfish from other states.

The Marine Resources Division has a program in place to notify the public about the hazards of placing oysters harvested out of state into South Carolina waters. The division has developed a program of recycling shells and encouraging people not to put shells directly back in the water.

### **Goal and priorities**

The goal of the communication pilot project is to increase the level of awareness and action to address aquatic invasive species problems by communicating the significance of the problems, current and potential dangers, and potential solutions in order to mitigate negative impacts on South Carolina's natural resources, human health and safety, and economic environment.

SCDNR assembled a Planning Team to develop the communications plan. The team identified the ANS species of greatest concern:

1. Aquatic plants.
  - a. Hydrilla.
  - b. Water hyacinth.
  - c. Water lettuce.
  - d. Giant salvinia.
  - e. Common reed.
  - f. Alligatorweed.
  - g. Brazilian elodea.
  - h. Water primrose.
  - i. Other species on the illegal possession list.
2. Avian Vacuolar Myelinopathy (AVM).
3. Zebra mussels and Asian clams.
4. Rapana whelk.

5. Green mussel.
6. Aquarium pets.
7. Ornamental pond species.
8. Invasive fish.
  - a. Flathead catfish.
  - b. Spotted bass.
  - c. Asian carp.
  - d. Lionfish.
9. Fish, shellfish, and shrimp diseases.
10. Invasive bait fish and shrimp.
11. Grass carp.
12. Invasive aquaculture species.
13. Beach vitex.

The team also selected the four most important audiences that need to receive information about ANS, listed from highest to lowest priority:

1. Recreational boaters, anglers and duck hunters.
2. Retail and wholesale aquarium pet stores, including internet sales and pet owners.
3. Plant nursery trade, including internet sales, greenhouses and farmers.
4. Public zoos, aquariums and botanical gardens.

### **Actions to be pursued during the pilot project**

1. Identify target audiences for freshwater (recreational users) and marine (seafood businesses).
2. Establish baseline data on awareness of ANS issues among participants at the Palmetto Sportsmen's Classic (large outdoor sport show).
3. Develop a pledge card for use at trade shows and possible distribution to boat registrants that encourages them to conduct boat cleaning behaviors to minimize the spread of ANS from one water body to another.
4. Join the newly formed Gulf and South Atlantic Regional Panel on Aquatic Invasive Species.
5. Work toward development of a statewide ANS Task Force and a South Carolina ANS management plan.
6. Conduct a direct mail information campaign to drive people to the SCDNR website on ANS issues. Conduct a follow-up survey to see if it worked.
7. Create an ANS information page in the 2004-05 SCDNR Rules and Regulations Publication.
8. Incorporate the *Stop Aquatic Hitchhikers* logo and links on SCDNR Aquatic Invasive Species web site and educational material.
9. Develop a South Carolina ANS page for the *Stop Aquatic Hitchhikers* site that identifies actions to reduce the likelihood of transferring aquatic invasive species from one water body to another and protecting estuarine waters from shellfish disease contamination.

### **Funding the effort**

SCDNR supplemented its pilot state funding with the following:

1. **State Aquatic Plant Management Trust Fund:** About \$1,000 from this fund was used to assist with communication efforts. Funds come from sale of its publication “Aquatic and Wetland Plants of South Carolina.”
2. **State Water Recreational Resources Fund:** About \$10,000 from this fund was used to help print brochures and outreach materials. Funds come from boat gas tax revenues.

## **III. Outcomes of the pilot project actions**

### **Outcomes and progress**

Progress for projected outcomes are:

1. Identify target audiences for freshwater (recreational users) and marine (seafood businesses).  
**Progress:** The ANS Planning Team identified a total of nine target audiences for communications regarding ANS issues. The team further prioritized this list and focused efforts on the top four audiences (see details in communications strategy).
2. Establish baseline data on awareness of ANS issues among participants at the Palmetto Sportsmen’s Classic (Outdoor sport show).  
**Progress:** Over 400 hunters and anglers were surveyed at the annual Palmetto Classic Trade Show to determine their awareness of ANS issues. Results from the initial survey (Appendix A) indicate that most respondents had fairly good awareness of ANS issues—at least in a general sense.

Respondents were asked to identify the places that they have seen or heard information about nuisance or problematic water plants and animals. Information on boat ramp signs (1), in DNR fishing/hunting regulations booklet (2), and magazine articles (3) were generally the most common source (Table 1) and the Internet was last.

3. Conduct a direct mail information campaign to drive people to the SCDNR website on ANS issues. Conduct a follow-up survey to see if it worked.  
**Progress:** SCDNR mailed ANS information to the people who completed the baseline survey above. People surveyed after the mailing was sent had a generally higher awareness of most ANS issues than they had at the time of the baseline survey.

Respondents were randomly separated into two treatment groups and a control group. One treatment group was sent a one-page letter (Appendix B) describing preventative measures and a brief description of the impacts of aquatic nuisance species. The second treatment group received a post card (Appendix C) with three general guidelines to prevent the spread of aquatic nuisance species and the Stop Aquatic Hitchhikers web site location for additional information. The control group received no targeted communication regarding aquatic nuisance species.

After this information was distributed, a follow-up survey (Appendix D) was conducted to evaluate the effectiveness of the communication effort. A total of 129 individuals

responded to the survey; of those, 40 received the informational letter, 50 the postcard and 39 nothing (control group). Complete survey results are located in Appendix E.

All post-treatment respondents (including the control group) indicated that it was more important to keep fast-spreading, non-native aquatic plants and animals out of South Carolina rivers and lakes than did respondents of the pre-treatment survey. Respondents who received the postcard recognized that transporting fish from one body of water to another can be harmful to the environment more than respondents that received the letter; however, those who received additional information recognized this more than both the control group and pre-treatment respondents.

Similarly, respondents who received the postcard generally were more informed than those who received the letter, but both groups were more informed than the control group and pre-treatment respondents on the following issues:

- Dumping unused bait overboard provides a good food source for game fish.
- It is better to dispose of unused bait on land than to dump it into the water.
- Harmful, invasive plants can be transported from one water body to another on boats and trailers.
- Washing or rinsing off your boat and trailer after take-out can prevent the spread of disease and harmful organisms.
- Stocking fish from one body of water to another is a good way to improve the fishing.

The top three sources of ANS information for the participants remained the same but in slightly different order (Table 1): DNR regulations booklet (1), boat ramp signs (2), and magazine articles (3). Surprisingly, the Internet remained the least likely source of ANS information. This should provide crucial information on how to best communicate with this audience.

Table 1: Relative ranking of sources of information about nuisance or problematic water plants and animals by response group.

	<b>Pre Treatment</b>	<b>All Post Treatment</b>	<b>Treatment 1 Letter</b>	<b>Treatment 2 Postcard</b>	<b>Control</b>
	<b>Relative ranking</b>				
DNR fishing/hunting regulations	2	1	1	1	2
Magazine article	3	3	3	3	3
Newspaper article	4	4	4	4	5
Television	5	5	5	5	4
Signs at boat ramps	1	2	1	1	1
Printed information at bait dealers	6	7	7	7	8
Conservation officers (wardens)	8	8	8	8	7
Friend	7	6	6	6	6
Internet	9	9	9	8	9
Have not seen or heard any info	10	10	10	10	10

4. Create an ANS information page in the 2004-05 SCDNR Rules and Regulations publication.

**Progress:** This was completed for both the 2004-05 and 2005-06 publications. Plans are to continue and expand the ANS information in the annual Rules and Regulations publications especially in light of survey results, which indicate that the DNR Rules and Regulations booklet is one of the top two sources of ANS information for sportsmen.

5. Incorporate the *Stop Aquatic Hitchhikers* logo and links on SCDNR Aquatic Invasive Species website and educational material.

**Progress:** The SAH logo and the Habitattitude logo are now present on all DNR aquatic invasive species brochures and website. Logos on the website are hotlinked back to the SAH and Habitattitude websites. The logos add a professional flare to the publications and provide national recognition by the public of program efforts.

6. Develop a South Carolina ANS page for the *Stop Aquatic Hitchhikers* site that identifies actions to reduce the likelihood of transferring ANS from one water body to another and protecting estuarine waters from shellfish disease contamination.

**Progress:** This has been completed, and the page ([www.protectyourwaters.net/states/sc.php](http://www.protectyourwaters.net/states/sc.php)) is cross-linked to South Carolina ANS Program website ([www.dnr.sc.gov/water/envaff/aquatic/index.html](http://www.dnr.sc.gov/water/envaff/aquatic/index.html)). The number of hits to the DNR ANS website has doubled from about 37,000 in 2003 to 74,000 in 2005. Hopefully, this was a result of the crosslink with the SAH website.

7. Develop a pledge card for use at trade shows and possible distribution to boat registrants that encourages them to conduct boat cleaning behaviors to minimize the spread of ANS from one water body to another.

**Progress:** This has been completed (see Appendix F). SCDNR printed 1,000 pledge cards and worked to distribute them at sports shows like the Palmetto Sportsmen's Classic and Southeastern Wildlife Exposition where staff have one-to-one interaction with the public. Unfortunately, staff had a very difficult time getting the public to take the pledge cards, much less having them sign them. It may be more receptive to a younger audience in a school setting.

8. Join the newly formed Gulf and South Atlantic Regional Panel on Aquatic Invasive Species.

**Progress:** SCDNR joined the GSA Regional Panel in 2005. The DNR has two representatives: Steve de Kozlowski represents the freshwater interests and Dale Thieling the marine interests. Membership has provided heightened awareness of and participation in regional interstate ANS activities and created an instant network of colleagues throughout the region focused on ANS issues. This effort lead to state involvement in the creation of a SEAFWA Aquatic Nuisance Species Committee, which Steve de Kozlowski chairs.

9. Work toward development of a statewide ANS Task Force and a South Carolina ANS management plan.  
**Progress:** SCDNR plans to use the ANS Communications Plan Advisory Committee and the Communications Plan as a springboard for development of the ANS Task Force and its statewide ANS Management Plan. The state is considering the various task force models already established by other states. A final plan is anticipated by spring of 2007.
10. Communicate with SCDNR Boater Registration section on ways to provide the 395,000 registered boaters in South Carolina with ANS information and actions to prevent and minimize spread in public waters.  
**Progress:** SCDNR staff made preliminary contacts with the Boat Titling Section and have explored ways to share information with boaters. Options include providing brochures at the DNR regional boat registration offices, include ANS messages on the outside of the sealed boater registration reminder letters, and target ANS mailings to high risk boater groups derived from the boater registration database.
11. Expand ANS Communications Project Work Group to Statewide ANS Task Force  
**Progress:** The state is reconsidering the idea of simply expanding the work group to form the ANS Task Force. SCDNR will conduct a thorough evaluation of the structure of ANS Task Forces in other Southeastern states and existing invasive species councils prior to finalizing the South Carolina ANS Task Force.

## IV. Project highlights and recommendations

### South Carolina's pilot project highlights

Perhaps the greatest strongpoint of the ANS pilot project was elevating ANS issues among SCDNR leaders and staff. "It was a chance to facilitate internal communications; this part has worked very well," says Steve de Kozlowski, chief of Environmental Conservation Section and leader of this ANS pilot project. "It was a springboard to developing the statewide ANS Task Force and management plan. Leaders and staff now recognize ANS as an important natural resource management concern that requires ongoing communication and action."

The following summary points show the benefits of ANS pilot state planning:

1. The ANS pilot state communications project strongly accelerated intra-agency and inter-agency communication on ANS issues
2. The pilot project served as a catalyst for staff to discuss and take action on ANS issues.
3. IAFWA's backing was a key to success by elevating the importance of the project within the SCDNR. As a result, interdivisional cooperation has improved and project initiatives are more readily accepted and approved.
4. Assistance from project consultants was invaluable and critical in moving forward. They essentially served as project staff to schedule and facilitate work group meetings, write the communication strategy, develop and analyze surveys, develop pledge cards, suggest communication ideas, and steadily (but diplomatically) push the process along.

5. It brought federal and state agencies together for the first time to discuss their interests in ANS issues and opportunities for cooperative communication.

### **Recommendations to other Southeastern states**

South Carolina fell prey to bad timing as part of the ANS project. SCDNR received IAFWA's grant to complete the pilot state project just as the agency was experiencing major budget and staff cuts. With the loss of funding and staff, the SCDNR simply had less to give.

"The greatest barrier for South Carolina is the manpower and budget shortage," says de Kozlowski. "We were realistic about what we could do cheaply and easily, but there was a real limit to what we could accomplish. Other inter-agency partners were swamped as well, but they did the best they could to help. It was a real frustration, because this ANS project provides huge possibilities. Despite that, things have advanced for South Carolina in terms of ANS partnerships, focus and priorities, and that's encouraging. Of course, there is always more than could have been done."

So while states can glimpse the stars regarding ANS, it's important to keep their feet on solid ground when realizing what can be accomplished within common state agency realities. The flipside is not to let barriers be all consuming. It's important to seek ways around barriers when possible, and that's where these recommendations can help.

Based on its pilot project experience, SCDNR makes the following recommendations for other states to help advance their ANS efforts:

1. Formalize ANS communications within your agency and establish clear points of contact for different divisions (fisheries, wildlife, marine, land/water resources, law enforcement).
2. Enhance instate communication/coordination by identifying agencies with ANS authority and interest and creating ad hoc or permanent work group to begin dialogue.
3. Enhance regional communication/coordination by joining and participating in one or more of the Southeastern ANS regional panels such as the Gulf and South Atlantic Regional Panel, Mississippi River Basin Panel and/or Mid-Atlantic Regional Panel.
4. If possible, hire staff or consultants that are knowledgeable and dedicated to working on the communication strategy or management plan. If that is not possible, use the model materials already developed by pilot states and modify them to suit your state's needs.
5. Identify the most important sources of ANS information for your citizens and direct resources to those sources.
6. At a minimum, develop state/agency ANS webpage that identifies problems and potential problems in your state and actions (behaviors) the public can take to help prevent introduction and spread of ANS.
7. Identify partners who can support and further ANS issues and carry the ball, when budget cuts and manpower shortages limit what states can effectively accomplish.

"ANS communication doesn't take a lot of money to implement, but it does take time and leadership," de Kozlowski concludes. "We know from experience that communications provides huge saving in avoided control costs through prevention and rapid response. But state agencies can't do it by themselves; they need outside help and internal resources to make it happen."

## Appendix A. Initial Aquatic Resources Survey at Palmetto Classic

### Aquatic Resources Survey

The SCDNR would like to know your opinions on a few aquatic resources issues. Please answer the following handful of questions for a chance to win one of three \$50 gift certificates from Bass Pro Shops!

Name \_\_\_\_\_

Address \_\_\_\_\_

“Your contact information will NEVER be given out to anyone and it will only be used once to send you a short follow-up survey in about one year”

**411 completed surveys received:  
- 72.5% male.**

Which best describes your outdoor activities: Which of the following activities do you enjoy the most.

1. Hunting	59.1%	(Top 4: Fishing, hunting, camping, boating)
2. Fishing	76.4%	
3. Hiking	8%	
4. Camping	24.8%	
5. Canoeing	4.4%	
6. Kayaking	1.9%	
7. Pleasure boating	18.2%	
8. Other:	1.9%	

Please answer the following questions:

1. Is it important or unimportant that *fast-spreading*, non-native aquatic plants and animals are kept out of South Carolina rivers and lakes?

a. Very important	73.2%	Male 75%	Female 22%
b. Somewhat important	18.2%	Male 77%	Female 21%
c. Neither important nor unimportant	1.5%	Male 84%	Female 17%
d. Somewhat unimportant	1.2%	Male 40%	Female 40%
e. Very unimportant	0.5%	Male 50%	Female 50%
f. Don't know	4.9%	Male 53%	Female 37%

2. Please indicate if each statement is true or false:

Transporting fish from one body of water to another can be harmful to the environment.

True 84.8% Male 75% Female 21%

Dumping unused bait overboard provides a good food source for game fish.

True 39.9% Male 75% Female 20%

It is better to dispose of unused bait on land than to dump it into the water.

True 64.6% Male 75% Female 22%

Harmful, invasive plants can be transported from one water body to another on boats and trailers.

True 90.1% Male 75% Female 22%

Washing or rinsing off your boat and trailer after take-out can prevent the spread of disease and harmful organisms.

True 97.3% Male 74% Female 23%

Stocking fish from one body of water to another is a good way to improve the fishing.

True 39.6% Male 76% Female 23%

2. Please check all the things you believe are true about the following water plants in South Carolina:

	<b>Water Lettuce</b>	<b>Hydrilla</b>	<b>Water Hyacinth</b>	<b>Giant Salvinia</b>
Not native to South Carolina	23.3%	36.6%	21.8%	22.8%
Male	79.0%	80.0%	77.0%	78.0%
Female	13.0%	16.0%	14.0%	15.0%
Improves hunting	10.8%	6.3%	3.8%	5.5%
Male	88.0%	80.0%	74.0%	77.0%
Female	10.0%	20.0%	27.0%	15.0%
Invasive (grows & spreads fast)	16.0%	45.1%	18.3%	13.5%
Male	77.0%	81.0%	85.0%	80.0%
Female	18.0%	16.0%	10.0%	12.0%
Interferes with boating & fishing	15.3%	40.6%	19.3%	13.3%
Male	81.0%	84.0%	84.0%	85.0%
Female	15.0%	13.0%	13.0%	10.0%
Important habitat -improves fishing	12.5%	16.0%	12.0%	7.0%
Male	74.0%	77.0%	88.0%	83.0%
Female	19.0%	21.0%	7.0%	11.0%
Valuable ornamental	7.5%	5.3%	8.3%	4.8%
Male	87.0%	72.0%	60.0%	78.0%
Female	7.0%	29.0%	32.0%	17.0%
Don't know	50.1%	35.3%	46.0%	48.9%
Male	71.0%	66.0%	70.0%	70.0%
Female	27.0%	33.0%	28.0%	28.0%

4. Please check if each of the following statements are true or false:

Blue catfish are not native to South Carolina—they were introduced from other places into South Carolina lakes systems.

True 62.8% Male 78% Female 20%

Flathead catfish are not native to South Carolina—they were introduced from other places into South Carolina lakes systems.

True 46.7% Male 76% Female 18%

Flathead catfish are popular for fishing in many South Carolina lakes (especially Santee-Cooper), but in rivers, they are displacing a previously popular fishery for native catfish and redbreast sunfish.

True 80.6% Male 77% Female 19%

Spotted Bass are not native to South Carolina- they were introduced from other places into South Carolina lake systems.

True 57.5% Male 79% Female 18%

Striped Bass are not native to South Carolina- they were introduced from other places into South Carolina lake systems.

True 43.8% Male 75% Female 21%

5. Please check all of the following places you have seen or heard information about “nuisance” or problematic water plants and animals:

Signs at boat ramps

Yes 66.1% Male 77% Female 19%

Printed information at bait dealers

Yes 31.7% Male 84% Female 12%

DNR fishing/hunting regulations booklet

Yes 61.6% Male 79% Female 18%

Magazine article

Yes 47% Male 76% Female 22%

Newspaper article

Yes 37.7% Male 72% Female 24%

Internet

Yes 13.3% Male 85% Female 6%

Television

Yes 37.2% Male 79% Female 18%

Friend

Yes 25.4% Male 79% Female 17%

[ ] Conservation officers (Game wardens)

Yes 21.4%    Male 77%    Female 16%

[ ] Not seen or heard any information

Yes 9%    Male 64%    Female 31%

[ ] Other

Yes 3.8%    Male 67%    Female 20%

## **Appendix B. Aquatic Resources Survey Treatment Group 1 Letter**

*Printed on SCDNR Letterhead*

Dear [person's name]:

We're contacting you, because you've been recognized as someone who cares about South Carolina's natural resources.

**South Carolina needs your help to keep non-native aquatic plants and animals out of South Carolina's rivers and lakes.**

South Carolina boasts some of the best hunting, fishing, and boating in the country. However, South Carolina's natural resources are threatened by creatures that hitchhike with us from one source of water to another. Learn what you can do to protect your waters and STOP AQUATIC HITCHHIKERS:

### **Clean All Recreational Equipment Before and After Using All South Carolina Waters - Don't Give Water Weeds a Free Ride -**

Regular cleaning of your boat, motor, trailer, and other equipment used in the water can greatly reduce the spread of aquatic nuisance species. It takes a few minutes, but it is worth it to protect the places you enjoy.

In South Carolina, plants such as hydrilla, water hyacinth, giant salvinia, and water lettuce displace valuable native plants, particularly in wetlands and in shallow water along shorelines. These plants can choke waterways and make it impossible to boat or swim. Preventing the occurrence and spread of aquatic weed infestations in public waters can save millions of public and private dollars each year in avoided control costs. As a further deterrent, South Carolina law includes fines up to \$500 and/or imprisonment for persons spreading nuisance aquatic weeds.

### **Don't Transfer Fish Between Water Bodies**

Some anglers release their catch into other lakes and ponds. This can cause two different problems. One, the fish you release may contain harmful hitchhikers, disease or viruses. And two, you might upset the balance of the lake, pond or river.

Professional fisheries biologists of SCDNR are responsible for all legal stocking of fish species into the public waters of the South Carolina. This is undertaken only after consideration of all pertinent benefits and consequences. Fish stocking by

private citizens is managed by SCDNR and requires a permit. Unregulated stocking by citizens has produced detrimental effects.

For example, flathead catfish and blue catfish are native to the Mississippi drainage and were first put into lake systems in South Carolina during the 1960s, where they thrived and became popular—especially in the Santee-Cooper system. They are now found in the Edisto River (a blackwater river) and several coastal rivers. While they provide recreational benefit in lake systems, they can be very invasive and damaging to the unique river fish naturally found in South Carolina.

Spotted bass populations also are not native to South Carolina. They are found in the Tennessee drainage, Lake Lanier in Georgia and parts of Alabama. They appear to have been illegally introduced by anglers into Lakes Jocassee, Keowee, Hartwell, and Russell in South Carolina. They can degrade native redeye bass populations through competition and hybridization. Spotted bass also are correlated with declines in crappie fisheries in some areas.

### Dispose of Bait Properly – Do Not Dump Your Bait into Waters

Whether you're fishing in salt or freshwater, it is important to dispose of unused bait (especially LIVE BAIT!) properly. It is best if you place your unused bait in a sealed container and then put it in the trash. Even if you use bait as fertilizer, it is better than throwing it back in the water. If you plan to reuse live bait for a future fishing trip, make sure they are in a sealed container where they cannot escape. It is critical that you not dump the bait or contents into the water. Dumping into ditches may lead back into a water body of concern, too. Even if you think your bait is native, it has the potential to include nuisance species and or contain a disease that can have negative impacts on your fishery.

Learn more at [www.protectyourwaters.net](http://www.protectyourwaters.net)

Nuisance species are one of the greatest threats to our fishery and water resources. Visit Protect Your Waters site to learn what is happening across the country and click on the South Carolina state page to keep abreast of our state nuisance species issues.

### Make a Pledge to STOP AQUATIC HITCHHIKERS

We hope you pledge to help Stop Aquatic Hitchhikers. For your own reference, check the sections that you will pledge to abide by.

- I will clean all my recreational equipment (boats, motors, trailers, waders, fishing equipment, etc) before and after using all waters.
- When I release fish, I'll release them in the water they came out of and not transfer them to another body of water.

- If I use bait, I will dispose of it properly.
- I'll encourage my friends to help STOP AQUATIC HITCHHIKERS

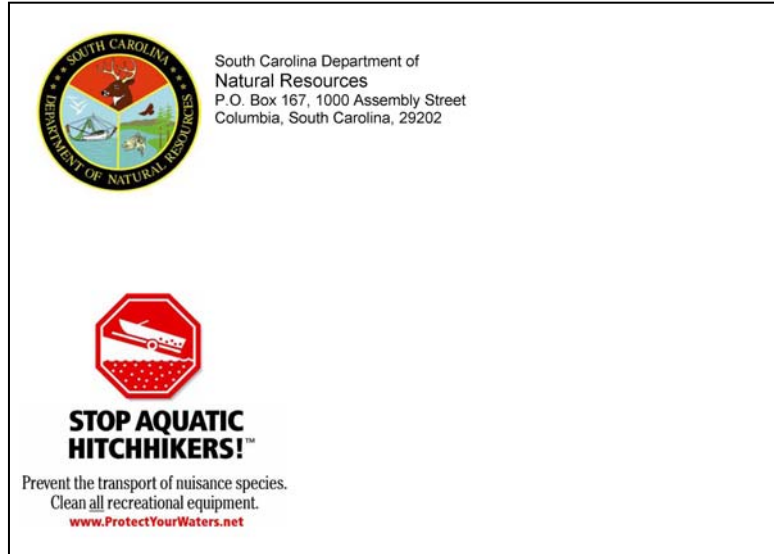
We thank you for being part of the solution, and not part of the problem.

You can learn more by going to [www.protectyourwaters.net](http://www.protectyourwaters.net) and selecting South Carolina on the right hand menu or going directly to the South Carolina page at [www.protectyourwaters.net/states/sc.php](http://www.protectyourwaters.net/states/sc.php)

Sincerely

Steve de Kozlowski  
Aquatic Nuisance Species Project Coordinator

## Appendix C. Aquatic Resources Survey Treatment Group 2 Postcard



## Appendix D. Aquatic Resources Follow-up Survey Form



# Aquatic Resources Follow-up Survey

The South Carolina Department of Natural Resources (SCDNR) would like to know your opinions on a few aquatic resources issues. (You may have been asked to complete a similar survey on these issues about a year ago.) Please answer the following handful of questions for a chance to win one of three \$50 gift certificates from Bass Pro Shops!

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Male

Female

*Your contact information will NEVER be given out to anyone. It will only be used to match responses of the people who completed a survey last summer, and to send gift certificates to contest winners.*

1. Did you complete a survey form like this last year?

Yes       No       Don't Remember

2. Which of the following activities do you enjoy the *most*? Check all that apply.

Hunting

Fishing

Hiking

Camping

Canoeing

Kayaking

Pleasure boating

Other: \_\_\_\_\_

Please answer the following questions:

3. Is it important or unimportant that fast-spreading, non-native aquatic plants and animals are kept out of South Carolina rivers and lakes? (Please check ONE box below).

Very important

Somewhat important

Neither important nor unimportant

- Somewhat unimportant
- Very unimportant
- Don't know

4. Please indicate if each statement is true or false:

<b>True</b>	<b>False</b>	<b>Statement</b>
<input type="checkbox"/>	<input type="checkbox"/>	Transporting fish from one body of water to another can be harmful to the environment.
<input type="checkbox"/>	<input type="checkbox"/>	Dumping unused bait overboard provides a good food source for game fish.
<input type="checkbox"/>	<input type="checkbox"/>	It is better to dispose of unused bait on land than to dump it into the water.
<input type="checkbox"/>	<input type="checkbox"/>	Harmful, invasive plants can be transported from one water body to another on boats and trailers.
<input type="checkbox"/>	<input type="checkbox"/>	Washing or rinsing off your boat and trailer after take-out can prevent the spread of disease and harmful organisms.
<input type="checkbox"/>	<input type="checkbox"/>	Stocking fish from one body of water to another is a good way to improve the fishing.
<input type="checkbox"/>	<input type="checkbox"/>	Dumping unused bait overboard provides a good food source for game fish.

5. Please check all the things you believe are true about the following water plants in South Carolina:

	Water Lettuce	Hydrilla	Water Hyacinth	Giant Salvinia
Not native to South Carolina	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improves hunting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Invasive (grows and spreads fast)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interferes with boating and fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Important habitat / improves fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Valuable ornamental	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Don't know	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Please check if each of the following statements is true or false:

<b>True</b>	<b>False</b>	<b>Statement</b>
<input type="checkbox"/>	<input type="checkbox"/>	Blue catfish are not native to South Carolina—they were introduced from other places into South Carolina lake systems.
<input type="checkbox"/>	<input type="checkbox"/>	Flathead catfish are not native to South Carolina—they were introduced from other places into South Carolina lake systems.
<input type="checkbox"/>	<input type="checkbox"/>	Flathead catfish are popular for fishing in many South Carolina lakes (especially Santee-Cooper), but in rivers, they are displacing a previously popular fishery for native catfish and redbreast sunfish.
<input type="checkbox"/>	<input type="checkbox"/>	Spotted Bass are not native to South Carolina—they were introduced from other places into South Carolina lake systems.
<input type="checkbox"/>	<input type="checkbox"/>	Striped Bass are not native to South Carolina—they were introduced from other places into South Carolina lake systems.

7. Please check *all of the following* places you have seen or heard information about “nuisance” or problematic water plants and animals:

- |  |   |
|--|---|
| <input type="checkbox"/> Signs at boat ramps                     | <input type="checkbox"/> Printed information at bait dealers    |
| <input type="checkbox"/> DNR fishing/hunting regulations booklet | <input type="checkbox"/> Magazine article                       |
| <input type="checkbox"/> Newspaper article                       | <input type="checkbox"/> Internet                               |
| <input type="checkbox"/> Television                              | <input type="checkbox"/> Friend                                 |
| <input type="checkbox"/> Conservation officers (Game wardens)    | <input type="checkbox"/> Have not seen or heard any information |
| <input type="checkbox"/> Other: _____                            |   |

Thank you! Now please place your completed survey in the enclosed self-addressed envelope and return it to:

South Carolina DNR—Aquatic Nuisance Species Survey Responses  
In care of D.J. Case & Associates  
317 E. Jefferson Blvd.  
Mishawaka, IN 46545

Three respondents will win \$50 gift certificates to Bass Pro Shops!

## Appendix E. Aquatic Resources Follow-up Survey Results



# Aquatic Resources Follow-up Survey

The South Carolina Department of Natural Resources (SCDNR) would like to know your opinions on a few aquatic resources issues. (You may have been asked to complete a similar survey on these issues about a year ago.) Please answer the following handful of questions for a chance to win one of three \$50 gift certificates from Bass Pro Shops!

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Pre: n=411 Post: n=135

Item	Pre	Post
Male	72.5%	78%
Female	27.5%	22%

1. Did you complete a survey form like this last year?

32.1% Yes	21.4% No	46.6% Don't Remember
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2. Which of the following activities do you enjoy the *most*?

Item	Pre	Post
Hunting	59.1%	74.1%
Fishing	76.4%	89.6%
Hiking	8.8%	23.7%
Camping	24.8%	48.1%
Canoeing	4.4%	13.3%
Kayaking	1.9%	46.7%
Pleasure boating	18.2%	46.7%
Other	1.9%	14.1%

Please answer the following questions:

3. Is it important or unimportant that fast-spreading, non-native aquatic plants and animals are kept out of South Carolina rivers and lakes? (Please check ONE box below).

Option	Pre	Post
Very important	73.2%	84.4%
Somewhat important	18.2%	12.6%
Neither important nor unimportant	1.5%	0.7%
Somewhat unimportant	1.2%	0.0%
Very unimportant	0.5%	0.7%
Don't know	4.9%	1.5%

4. Please indicate if each statement is true or false:

TRUE		FALSE		Statement
Pre	Post	Pre	Post	
84.8%	90.2%	15.2%	9.8%	Transporting fish from one body of water to another can be harmful to the environment.
39.9%	22.4%	60.1%	77.6%	Dumping unused bait overboard provides a good food source for game fish.
64.6%	76.1%	35.4%	23.9%	It is better to dispose of unused bait on land than to dump it into the water.
90.1%	97.0%	9.9%	3.0%	Harmful, invasive plants can be transported from one Water body to another on boats and trailers.
97.3%	98.5%	2.7%	1.5%	Washing or rinsing off your boat and trailer after take-out can prevent the spread of disease and harmful organisms.
39.6%	26.1%	60.4%	73.9%	Stocking fish from one body of water to another is a Good way to improve the fishing.

5. Please check all the things you believe are true about the following water plants in South Carolina:

Statement	Water Lettuce		Hydrilla		Water Hyacinth		Giant Salvinia	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Not native to South Carolina	23.3%	24.4%	36.6%	48.1%	21.8%	31.9%	22.8%	36.3%
Improves hunting	10.8%	9.6%	6.3%	5.9%	3.8%	4.4%	5.5%	3.0%
Invasive (grows and spreads fast)	16.0%	21.5%	45.1%	67.4%	18.3%	36.3%	13.5%	27.4%
Interferes with boating and fishing	15.3%	26.7%	40.6%	60.7%	19.3%	37.0%	13.3%	25.9%
Important habitat / improves fishing	12.5%	20.0%	16.0%	15.6%	12.0%	11.9%	7.0%	4.4%
Valuable ornamental	7.5%	5.9%	5.3%	2.2%	8.3%	8.1%	4.8%	3.7%
Don't know	50.1%	46.7%	35.3%	25.2%	46.0%	44.4%	48.9%	55.6%

6. Please check if each of the following statements is true or false:

TRUE		FALSE		Statement
Pre	Post	Pre	Post	
62.8%	67.2%	37.2%	32.8%	Blue catfish are not native to South Carolina – they were introduced from other places into South Carolina lake systems.
46.7%	45.2%	53.3%	54.8%	Flathead catfish are not native to South Carolina – they were introduced from other places into South Carolina lake systems.
80.6%	80.0%	19.4%	20.0%	Flathead catfish are popular for fishing in many South Carolina lakes (especially Santee-Cooper), but in rivers, they are displacing a previously popular fishery for native catfish and redbreast sunfish.
57.5%	65.6%	42.5%	34.4%	Spotted Bass are not native to South Carolina – they were introduced from other places into South Carolina lake systems.
43.8%	40.3%	56.2%	59.7%	Striped Bass are not native to South Carolina – they were introduced from other places into South Carolina lake systems.

7. Please check *all of the following* places you have seen or heard information about “nuisance” or problematic water plants and animals:

Places	Pre	Post
Signs at boat ramps	66.1%	74.8%
Printed information at bait dealers	31.7%	23.7%
DNR fishing/hunting regulation booklet	61.6%	75.6%
Magazine article	47%	62.2%
Newspaper article	37.7%	53.3%
Internet	13.3%	14.1%
Television	37.2%	48.9%
Friend	25.4%	31.9%
Conservation officers (Game Wardens)	21.4%	20.7%
Have not seen or heard any Information	9.0%	4.4%
Other	3.8%	6.7%

## Appendix F. Stop Aquatic Hitchhikers Pledge Card



**STOP AQUATIC HITCHHIKERS!**  
Prevent the transport of nuisance species.  
Clean all recreational equipment.  
[www.ProtectYourWaters.net](http://www.ProtectYourWaters.net)

**When you leave a body of water:**

- Remove any visible mud, plants, fish or animals before transporting equipment.
- Eliminate water from equipment before transporting.
- Clean and dry anything that comes into contact with water (boats, trailers, equipment, clothing, dogs, etc.).
- Never release plants, fish or animals into a body of water unless they came out of that body of water.

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**STOP AQUATIC HITCHHIKERS!**  
Prevent the transport of nuisance species.  
Clean all recreational equipment.  
[www.ProtectYourWaters.net](http://www.ProtectYourWaters.net)

**STOP AQUATIC HITCHHIKERS**  
**P L E D G E**

**I pledge to protect our waters. I will:**

- Clean all my recreational equipment before and after using all waters;
- Never release plants, fish or animals into a body of water unless they came out of that body of water;
- Help others understand why and how to stop aquatic hitchhikers!

\_\_\_\_\_

Signature

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**STOP AQUATIC HITCHHIKERS!**  
Prevent the transport of nuisance species.  
Clean all recreational equipment.  
[www.ProtectYourWaters.net](http://www.ProtectYourWaters.net)

\_\_\_\_\_

Name

\_\_\_\_\_

Address

\_\_\_\_\_

City

\_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

\_\_\_\_\_

Email

