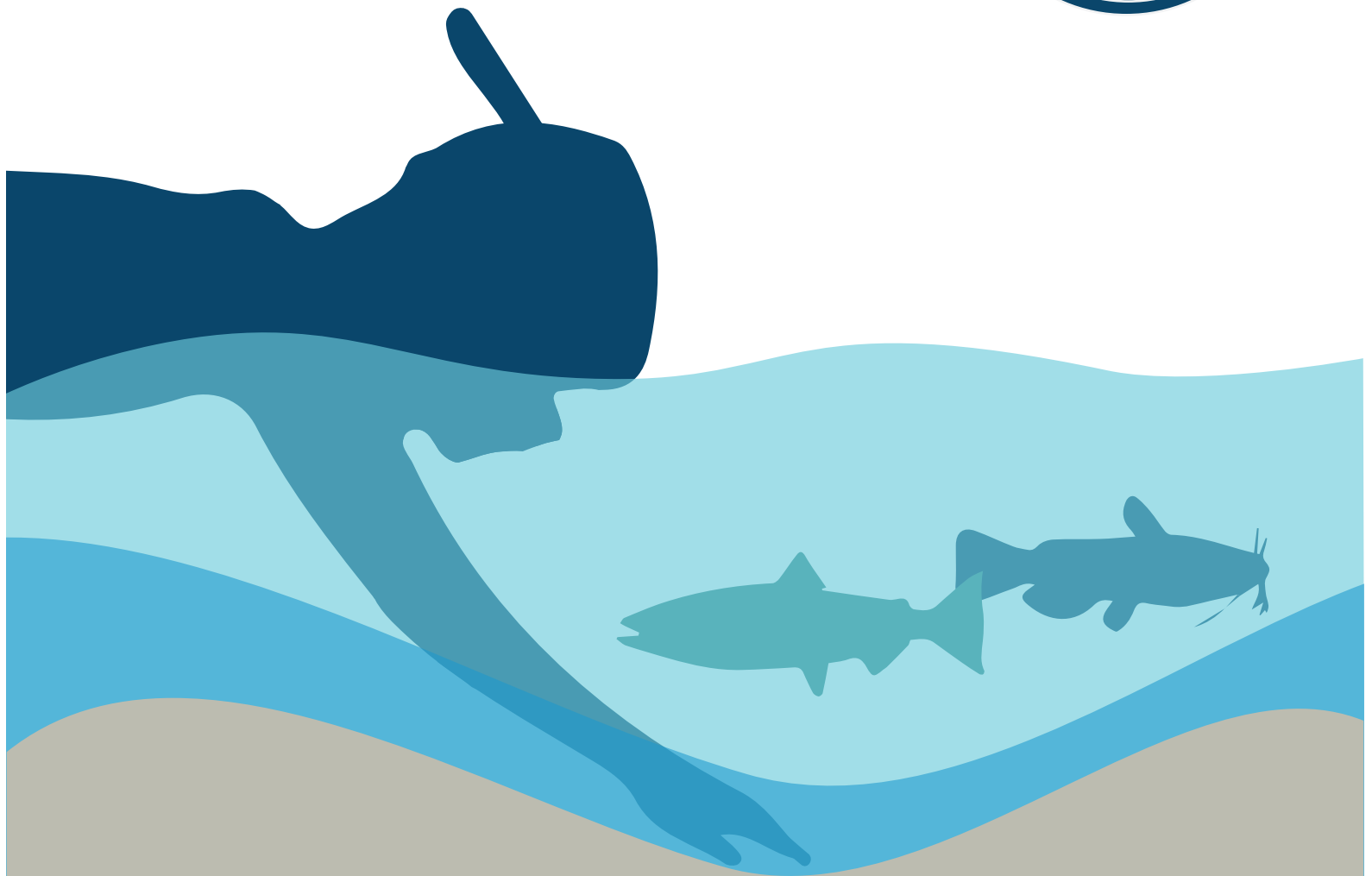


# Freshwater Snorkeling Toolkit



US Dept. of Agriculture



Forest Service



FS NatureWatch Program

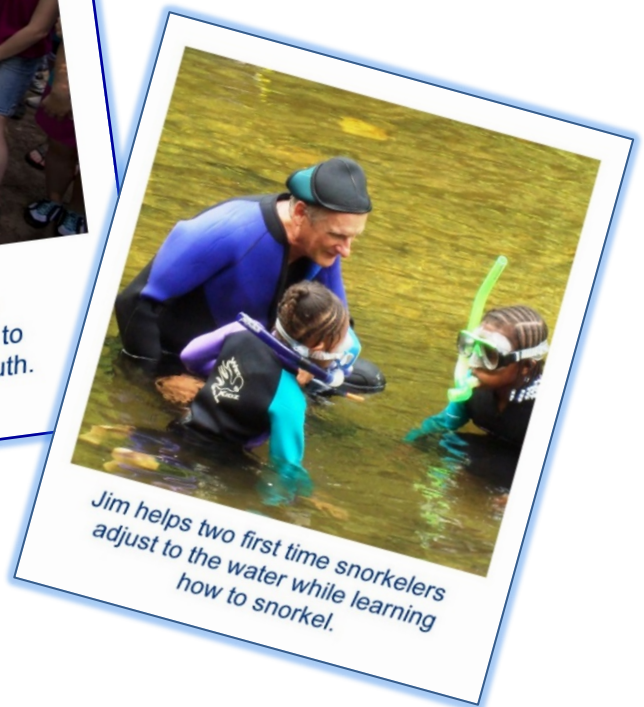


NorthBay

## FRESHWATER SNORKELING TOOLKIT



Jim Herrig, fisheries biologist on the Cherokee National Forest, gets ready to begin a day on the water with local youth.



Jim helps two first time snorkelers adjust to the water while learning how to snorkel.

*The authors would like to give a special thanks to Jim Herrig, Fisheries Biologist on the Cherokee National Forest. Jim's enthusiasm for sharing the wonders of the underwater world with others provided the impetus for the creation of this freshwater snorkeling toolkit. Jim's many contributions, including his expertise, experience and examples, fill the toolkit.*

*Thank you, Jim!*

***Happy Snorkeling, NatureWatchers!***



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## FRESHWATER SNORKELING TOOLKIT

# INTRODUCTION

Do you help care for our nation's beautiful and diverse public lands? Would you like to share a story about protecting and enjoying our clean streams and rivers? If so, check out the NatureWatch Snorkeling Toolkit, which contains information on how to set up your own freshwater snorkeling program.

For many people, snorkeling conjures images of coral reefs and tropical locations, but snorkeling can reveal new worlds in almost any body of water. Rivers and streams are teeming with life: fish, turtles, tadpoles, crayfish and much more call our waterways home.

By setting up a guided snorkeling program, you can demonstrate your commitment to managing the land and water in your care while highlighting a fascinating activity in a clear, cool stream. Help get people outside, unplugged, and immersed, teaching people of all ages about the wonderful animals living just beneath the surface of our local waterways.

### **Why start your own snorkeling program?**

Ecotourism and nature watching activities continue to attract visitors to our public lands every year. People want to learn about the natural world around them, and when possible, engage with the animals in a safe and non-intrusive way. Often, it is easy to find hiking, biking, boating and fishing opportunities on our public lands. It is harder to find activities that get you immersed in life underneath the surface of our rivers and streams.



For the online version of the toolkit, including fillable forms, please go to:  
<http://www.fs.fed.us/outdoors/naturewatch/tools/toolkits/snorkeling/>

# GETTING STARTED

Snorkeling is an activity that people of most ages and abilities can enjoy. With responsible oversight and quality equipment, you can immerse visitors in the wonderful world found just below the surface of our clean rivers and streams.

Obviously you want to create a guided snorkeling program that is safe, fun, beneficial to the public, and of minimal impact on the environment. It should be sustainable both financially and ecologically.



### CHOOSING A SITE

- ▶ An optimal snorkeling program location will have:
  - Clean, clear water during the time period you intend to offer programs
  - No whirlpools or strong currents that would be a risk to participants
  - A diversity of aquatic organisms
  - Different types of aquatic microhabitats such as slow, deep pools, and flat, shallow riffles
  - Sections with large woody debris
- ▶ Facilities to support group snorkeling should:
  - Be close enough to your physical location or office that staff can come and go easily
  - Have restrooms and picnic tables for participant use
    - *If not, portable toilets must be provided (Please do not ask participants to use the woods as facilities, as that can create uncomfortable situations for your guests and can create pollution and litter)*
  - Provide changing facilities
    - *Permanent structures would be ideal, but tents can be purchased and used temporarily*
  - Be easy for visitors to find and have adequate parking for the size of groups you intend to serve, including space for bus movements

### MATERIALS NEEDED



#### Suggested equipment

If you provide materials to snorkelers, you will need an adequate number of wetsuits, masks, and snorkels for your group. You will also need a place to store and dry the equipment, and a way to transport materials to your stream location. A full list of useful equipment is found in [Appendix A](#).

# FRESHWATER SNORKELING TOOLKIT



## PERSONNEL NEEDED

For a successful snorkeling program you need people who are passionate, energetic and enthusiastic about the aquatic world, and who are good at clearly explaining the amazing organisms found beneath the surface.

While the duties below do not necessarily require separate individuals, expect to need:

- ▶ **A program manager** – oversees the entire program.
- ▶ **Two guides** – provide onsite help, instruction and equipment maintenance [one for each snorkeling event].
  - Guides need to be comfortable with snorkeling, able to engage participants, and knowledgeable about aquatic organisms.
- ▶ **Two lifeguards** – provide for onsite safety [one for each snorkeling event]. Lifeguards may or may not need to be certified, but you need to be comfortable with their ability to keep people safe in the water. You may want to consider getting them certified prior to the snorkeling season, if your agency or local community requires the appropriate certification. The U.S. Forest Service requires lifeguards to be certified by a nationally-recognized certification agency, except when snorkeling activities are limited to shallow streams and rivers (see [Appendix H](#)).
  - They should also be friendly and communicative, and most importantly, assertive enough to ensure people follow safety directions.
- ▶ **An equipment manager** – tracks and stores equipment, maintains inventory.
  - Often, equipment duties can be assigned to the guides or lifeguards.
- ▶ **An administrative assistant** – coordinates communications, schedules programs, manages the calendar, and processes payments and bills.
  - This is not a full-time position, but you will need someone other than the guides or lifeguard to take on these tasks to keep your program running smoothly.

Having an extra guide and extra lifeguard on staff allows you to offer programs seven days a week and allows for schedule flexibility throughout the season.



## FRESHWATER SNORKELING TOOLKIT

# FUNDING



### START-UP COSTS (2014 ESTIMATES)

Costs will vary, depending on the size of the snorkeling program and the equipment you are able to buy, rent or have donated. If you are purchasing all equipment for about 20 participants, you can expect start-up costs of at least \$6,500, or much cheaper, if wetsuits are not needed. Details on these costs are found in [Appendix A](#).



### ANNUAL COSTS

Annual operation expenses for 30 program events of 20 participants each are estimated at \$13,500. Expected costs are:

- Onsite personnel: \$11,000 for your guides and lifeguards and equipment manager
- Administrative assistance: \$1,500
- Gear replacement: \$1000

This estimate does not include program oversight and management activities like hiring seasonal employees, training, certifications, and supervision. The program manager cost is often an existing employee and these costs may be absorbed in his/her salary. However, this is a large cost component and can represent a time commitment of up to 25 days the first year and 10 days per year thereafter.



A common occurrence in the northwest, a beaver slowly meanders downstream.



A group of local youth observe spawning fish.



# FRESHWATER SNORKELING TOOLKIT



## FUNDING OPTIONS

As you set up your program, you need to consider your funding options. Does your organization have the funds or grants available to run your program by allowing you to offer it for free to the visitor? Or, will you have to charge people to be able to provide a quality program?

- ▶ **Partnerships** – Work with your partnership or grants and agreements office to look for funding opportunities. Many environmental organizations may want to be associated with your program because of the public education opportunities. They may be able to provide funding or personnel. A list of suggested partners can be found in **Appendix B**.
- ▶ **Volunteers** – Talk to your agency's volunteer coordinator. They may be able to put you in touch with people who will volunteer to support your program. A list of Forest Service Volunteer Coordinators can be found here <http://www.fs.usda.gov/main/volunteer/coordinators>.
- ▶ **Fee** – If you have the ability to charge a fee, consider a price that both is equitable to visitors and helps your agency recover a reasonable cost. As an example, the Cherokee National Forest had been offering the snorkeling program without a charge to participants. However, in 2009, they began charging \$20 per person using the recreation fee authority. This enabled them to continue the program and they did not see diminished interest in people wanting to try freshwater snorkeling.

*Forest Service and other Federal agencies: Fees for interpretive services are authorized under the Federal Lands Recreation Enhancement Act [FLREA]. The Forest Service must follow FLREA and internal direction for implementing new fees, which includes a Federal Register notice, regional and national review, public involvement, and regional forester approval. For more information on setting up a recreation fee, Forest Service personnel can visit the [REA Toolbox](#).*



# MARKETING



### FINDING YOUR TARGET AUDIENCE

Finding interested snorkelers should not be hard, but you need to decide if you are open to scheduling individuals or groups.

- ▶ **Groups** – Scheduling people in groups allows the program organizer to have only one contact person for each session. This makes processing payments and communicating directions, packing lists, and other considerations easier for the provider. It is also simpler to have one point of contact in case of a cancellation.
- ▶ **Individuals** – A wider range of participants will be able to engage in the snorkeling experience if you open your registration to individuals. You need a way to handle multiple registrations per snorkeling event and a way to communicate with potential participants.
- ▶ **Schools** – Taking students snorkeling is an engaging way to help teachers reach required academic outcomes. It also connects students psychologically and intellectually to the river and forest.

Determine the age range you will serve. Twelve years old is a suggested minimum age, as children that age need less supervision and are easier to manage in a group setting.



### ADVERTISING YOUR PROGRAM

Your methods of getting the word out about the snorkeling program may be slightly different, depending on whether you are registering groups or individuals. For either option, you will need a way to share program information with people. A website, brochure, flyer or rack card is a great way to get the word out. Social media that targets specific programs and locations can also help you recruit snorkelers.

- For groups, you will want to make contact with schools, colleges, universities, youth organizations, environmental groups, watershed councils, summer camps, civic clubs and businesses.
- For individuals, you will want to share information with your local chamber of commerce, visitor centers, hotels, campgrounds and other places people look for outdoor activities.

There are currently very few organizations, private or public, who provide snorkeling opportunities in freshwater streams and rivers. It is conceivable that your initiative could evolve into a very popular outdoor experience for your agency or community!

# ADMINISTRATION

Organization is the key to a well-run program. Now that you have your program set up, you are ready to get people outside, unplugged, and underwater.



### SCHEDULING EVENTS

If you are open to holding your event any day of the week, weekdays or weekends, you will entice more people and groups to participate.



### REGISTRATION

Consider a registration form to keep track of who is attending your event and any other important information. If you work exclusively with groups, you only need one contact per group and can have that person track down details for you. If your event is open to individual registration, you will have to gather the appropriate information for each individual, which may include:

- Name
- Contact information (address, phone number, e-mail)
- Number of adults attending
- Number of kids attending
- Ages of kids attending

The information on number of participants and ages of kids will help give you an idea of size of the wetsuits needed. However, having a wetsuit that fits each and every participant can prove difficult. A disclaimer such as the following may help: “Wetsuits fit tightly, and may not be wearable by all participants. Please let us know if any of your participants have a condition that may affect the wearing of a wet suit. We will try to accommodate the condition, but may not be to do so in all cases.”

*Note that contact information is considered ‘personally identifiable information’ (PII) and is subject to the rules and policies of your organization for collecting and protecting that information. For Federal agencies, forms collecting PII must first be approved by the Office of Management and Budget. You may already have approved forms that could be used for this purpose.*



A cluster of *Margaritifera*, or freshwater pearl mussels, siphoning water.

# FRESHWATER SNORKELING TOOLKIT



## CONFIRMATION LETTER

Plan to send event confirmation to participants, with directions to the site and instructions on what the snorkelers should bring and wear.

If your event includes a fee, the confirmation should not be sent until the after receiving full payment for the session. Follow your collection officer policies; however, if possible, you may not want to cash a check or run a credit card for payment until after the scheduled snorkeling event has taken place. This makes it much easier to process refunds in case you have to cancel the event and are unable to reschedule.

Your confirmation letter should be sent two weeks prior to the snorkeling event to give participants enough time to plan for their trip. A confirmation letter template is available in [Appendix C](#). Confirmation letters should include:

- ▶ Scheduled date of reservation, with start and end times
- ▶ Directions, with a map, to the site from various starting points
  - You should provide expected travel times for each route. It is amazingly easy to get lost in the woods – even with a GPS – for people unfamiliar with driving forest roads
- ▶ Packing list – suggested items include:
  - swim suit
  - wading shoes/strap on sandals (not flip-flops!)
  - towel
  - lunch and drinking water
  - plastic bag for wet clothes
  - sunscreen
  - change of clothes
- ▶ Parking directions
- ▶ Any other pertinent information you want to share with your guests



## INVOICING

If you are planning to charge a fee for your event, you may need an invoice form. A sample of what is needed on the form is in [Appendix D](#).



## LIABILITY WAIVER

You must require the participants [or his/her parents/guardian, for those under 18 years of age] to sign a liability waiver. Please note: this is NOT OPTIONAL. ALL participants in your snorkeling MUST sign a waiver. If one is not on file, they will not be allowed to enter the water. Liability information for the U.S. Forest Service is found in [Appendix M](#).

# FRESHWATER SNORKELING TOOLKIT



## PHOTO RELEASE

If you anticipate taking photographs while the participants are at the site, please have each of them (or his/her parent/guardian) sign a photo release waiver form. A Forest Service photo release form is available in [Appendix E](#). To design your own photo release waiver form, or to see what the industry standard forms look like, check out the American Society of Media Photographers sample forms:

<https://asmp.org/tutorials/forms.html>.



## CANCELING EVENTS

You may need to cancel events due to inclement weather or poor water conditions. If you must cancel an event, doing so at least a day before the event is scheduled is preferred.

Have a cancellation plan ahead of time. Conditions under which you may want to cancel include:

- ▶ **Water or air temperature too cold** - Monitor weather conditions in your area.
  - Have set trigger points for these conditions that make sense to your area.
- ▶ **Lightning in the area** - Lightning and snorkeling do not mix. This is a situation where you may have to cancel a program at the site.
- ▶ **Water too high or clarity unacceptable** - Be familiar with your site. Know the water flow parameters required to provide a safe program. USGS provides water monitoring in rivers across the United States. You can use this website <http://waterdata.usgs.gov/usa/nwis/rt> or [water.weather.gov/ahps](http://water.weather.gov/ahps) to find a river sensor near your snorkel site.
  - Click on your state and drill down on the map to find the stream flow gages closest to your snorkel site. If there is a stream flow gage located within your larger watershed, it can help you determine the water flow level at your site.
  - If there is not a gage in your river, there may be a stream flow gage in a nearby watershed that can serve as a proxy.
  - Familiarize yourself with the long-term relationships between water flow, stage and clarity conditions at your snorkel site and the data from the nearest stream flow gage(s).
  - Regularly checking stream flow gage conditions can help you make the right call about whether conditions are favorable for snorkeling.

## FRESHWATER SNORKELING TOOLKIT

# EVENT DAY

Viewing organisms underwater is ideal when the sun is directly overhead, so that is when you want people in the water. Early and late hours have less direct sunlight and more shadows that disrupt your visitors' ability to fully appreciate the experience. Plan to have participants on site early enough to do a safety briefing, for them to suit up, and for you to provide an overview of what they will see when they get in the water.



### SET UP

You want to have your guides on site with plenty of time to set up before the snorkelers arrive. They should ensure that trash is picked up in the area, gear is laid out and organized, and the changing tents are set up. Guides should assess if the program can be held safely.



### SAFETY

A safety briefing should be conducted before anyone gets into the water. Topics to be discussed will include but are not limited to:

- Snorkeling boundaries
- Unacceptable behavior [rock throwing, excessive splashing, etc.] and their consequences
- Sharp objects [broken glass, fish hooks, rocks] and what to do if you find them
- Hypothermia
- Environmental threats: dangerous animals or insects, poison ivy, ticks, biting flies, and mosquitoes
- Wet suit buoyancy
- Moving in the water without disturbing sediments or rocks
- Slips, trips and falls
- Moving vehicles [in parking area]
- Young children should be paired; use the buddy system for safety

A sample site safety plan is found in [Appendix F](#).

A sample Job Hazard Analysis [JHA] for Forest Service personnel is available in [Appendix G](#).

Lifeguard certification requirements for the Forest Service are found in [Appendix H](#).

# FRESHWATER SNORKELING TOOLKIT



## LEARNING

Learning about the water and what's beneath. While you have the attention of the group and before they are provided with interesting distractions in the water, you should share an engaging overview of what they will be looking for and how conservation plays a role in ensuring the future of those resources. A more comprehensive list of topics to cover can be found in [Appendix I](#).

Having a prepared lesson plan will be helpful – A sample lesson plan from the Cherokee National Forest is offered in [Appendix J](#).

Your lesson plan should include:

- The definition of a watershed and a description of features and geographic boundaries of the watershed in which your stream is located
- Discussion of activities occurring both on the land and in the water upstream and downstream
- Any actions your organization is doing to protect and sustain the integrity of the watershed's resources
- Types of animals that participants may encounter
- Activities animals are doing – feeding, spawning, schooling, and hiding
- The aquatic microhabitats where animals are likely to occur
- Description of any physical characteristics that will aid in identifying species to the appropriate taxonomic [family] level



## SUITING UP

Familiarize participants with wetsuits, masks and snorkels. Bathroom breaks should be recommended prior to putting on wetsuits. Be aware that some snorkelers may require a considerable amount of time to get comfortable with the snorkels. Detailed instructions about helping participants put on their equipment is in [Appendix K](#).



# FRESHWATER SNORKELING TOOLKIT



## GETTING IN THE WATER

Once the snorkelers are suited up and are comfortable with their masks and snorkels, have them:

- Kneel in the water
- Make sure they have the snorkel in their mouth properly and that the mask fits tight
- Practice breathing through the snorkel
  - *Emphasize trying not to breathe through the nose – mouth only*
  - *Clear water from snorkels and maintain them in a vertical position*
- Practice clearing fog and water from masks
- Have them place their hands on the stream bottom and put their faces into the water while continuing to breathe
- Once they are able to breathe through the snorkel with their faces in the water, tell them to push their feet back and allow them to float
  - *At this point, only their hands should be touching the stream bottom*

Now, they are ready to experience the underwater features and gently pull themselves around the area to explore.



## DETAILS TO INCLUDE IN WATER SAFETY REMINDERS:

- Sometimes people feel weird in a wetsuit, note that your balance can be thrown off.
- Have people get used to being in the water before they move around.
- Water may leak into the mask. Don't panic.
- Emphasize that if someone feels uncomfortable and might be in trouble, they should turn around and lay on their back. The wetsuit can help you float until help arrives. NOTE: wetsuits are not flotation devices; they only offer a slight increase in buoyancy that can aid in flotation.
- Continually assess everyone for hypothermia and interest level.
- The lifeguard should be looking at the big picture and making sure everyone remains accounted for at all times.
- Some people get panicked about breathing while using the snorkel.
- Understand the potential for these feelings and anticipate spending a little extra time working on calming techniques.



# FRESHWATER SNORKELING TOOLKIT



## ENDING THE DAY

Have everyone get out of the water and carefully remove gear.

- ▶ Cleaning stations should already be set up for the wetsuits and snorkels, with tarps laid out for participants to place the equipment on after it is rinsed.
  - Wetsuits, masks and snorkels each require slightly different cleaning processes, detailed instructions are in **Appendix K**.
  - NOTE: Please be sure to dispose of the cleaning solution in areas that do not harm wildlife or vegetation. Do not dump this mixture in the stream. Consider bringing a closed container so that you can dump it in your waste water system later.



## FINAL INTERACTION WITH PARTICIPANTS

- ▶ Thank the group for participating in your snorkeling program. Give them an opportunity to talk about what they saw in the water and share experiences.
  - Consider quizzing them on what they learned and have a fun, interactive way of rewarding correct answers. Perhaps a bit of mud daubed on their face or a water-related prize. A sample list of objectives and information to share is available in **Appendix L**.
- ▶ Reemphasize that clean streams for snorkeling are due to good management by the Forest Service and other conservation-minded organizations, in addition to decisions they make about reducing their own impacts to water quality.
- ▶ Include a take home message about keeping waterways healthy and sharing what they learned with others. Give them tips on what they can do at home.
- ▶ Model a simple way participants can help keep our waterways healthy by engaging them in a quick trash pickup at the end of the day.



## LEAVING THE SITE

- ▶ Guides should check the area for lost items, ensuring the site is cleaned up before they leave. All participants should also grab any trash found in the watershed or river when they arrived and fill a bag to take out of the area to an appropriate waste pickup location.
- ▶ Equipment should be cleaned and stored for the next event.
- ▶ Guides may want to keep a record of which fish and other aquatic organisms were spotted that day to help with long-term data collection and trends.

# EVENT FOLLOW UP



### IMMEDIATELY FOLLOWING THE EVENT

Ask participants for feedback on the program. Ask them to describe the best part of the day and what could use improvement.

- ▶ Distribute comment cards or forms. These are a great way to allow people to anonymously share their opinions.
  - Think of creative ways to provide incentives for filling out comment cards.
  - Feedback helps you improve your program and allows participants to tell their story about the wonderful program you run. Take comments to heart but not personally. Be adaptable and responsive to concerns.



### FOLLOW-UP WITHIN A WEEK

During the days after a snorkeling event, make contact with the group leader. Making sure the group enjoyed their event will help you improve your program. Repeat business is always a good thing.

- ▶ If you did not solicit feedback at the conclusion of the event at the snorkeling site, provide them with a way to share their thoughts on the experience with you.
  - You may be able to set up an online comment form. Talk to your web manager to discuss options.



Snorkelers work together to find and identify native species.  
Courtesy Dave Herasimtschuk - Freshwaters Illustrated

- ▶ Enquire if they would like to write a review or story about their day that you could share.
- ▶ Consider sending a thank you note letting them know you enjoyed their visit.

# APPENDIX A

## SNORKELING EQUIPMENT LIST

The following equipment list is based on a program offered on Cherokee National Forest, which averages 22 participants. This assumes participants from 12 years old to adult. Typically you will need about one and a half times as many wetsuits as participants to ensure that you have enough to fit everyone in your groups.



### EQUIPMENT NEEDS

► **30 Wetsuits – Cost estimate = \$4,500**

- Note: do not buy separate suits for men and women. Having your equipment be unisex will make it easier to get everyone outfitted.
- Ask your group coordinator or individuals what size(s) they need to be sure you have the right mix of wetsuits.

---

Recommended size distribution

	<b># of wetsuits suggested</b>
Small	4
Medium	6
Large	6
XL	6
XXL	6
XXXL	2*

*\*Because wetsuits fit tightly, even the largest wetsuit may not accommodate all body types.*

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## FRESHWATER SNORKELING TOOLKIT

- ▶ Wetsuits come as one-piece and two-piece types.
  - One-piece suits require fewer suit pieces which make them easier to store and transport. They currently cost about \$100 each.
  - Two-piece suits give more flexibility for finding correct size fits for all participants and allow options when working with varying water temperatures. They currently cost about \$150 per set. NOTE: In the two piece suits, the portion that includes the pants and looks a little like overalls is also known as a 'farmer john'.

The ply [thickness] should be between four to five millimeters. This thickness is both warm and flexible. Less than four millimeters thick may not be warm enough, while suits with ply greater than five millimeters can diminish a person's flexibility. Suits should be purchased with zippers at the leg cuffs.



For the online version of the toolkit, including fillable forms, please go to:  
<http://www.fs.fed.us/outdoors/naturewatch/tools/toolkits/snorkeling/>

# FRESHWATER SNORKELING TOOLKIT



▶ **30 Masks and Snorkels – Cost estimate = \$1,050**

Good masks and snorkels cost about \$35.

**Recommended size distribution:** Purchase mostly adult sizes but have few kids' sizes, too. Some snorkels come with replaceable mouth pieces; the bite pads that go between the teeth tend to get bitten off.

▶ **4 Viewing Scopes – Cost Estimate = \$300**

Underwater viewers are good for people who don't want to be fully submerged or who cannot use a wetsuit. They do not provide nearly as good of an experience as a mask and snorkel.



▶ **2 Changing Tents – Cost estimate = \$200**

Tents need to be tall enough so people can stand up and comfortably change. Zippers and poles tend to wear out, so try to keep a set of replacement poles. You may also want to develop a button closure system to mitigate issues with the tent zippers.



▶ **Four Tubs – Cost Estimate = \$75**

Large [45 quart] rectangular tubs with lids work well for transporting the wetsuits and for rinsing them after use.

▶ **1 Large Tarp – Cost Estimate = \$20**

A 10 x 12 foot tarp is needed for laying out the wetsuits at the snorkeling site. It keeps them cleaner than putting them on the ground.

▶ **2 Jugs of Cleaning Solution – Cost Estimate = \$200**

They are solutions to rinse the wetsuits between uses and are widely available online.



▶ **10 bottles of Defogging Solution – Cost Estimate = \$40**

These are small bottles of a soap solution that is spread on the inside lens of the mask to keep the lens from fogging. They are cheap but expect to go through a lot of bottles. It's a good idea for your guides to carry a bottle in their wetsuit so they can assist people with fogged up lenses during the session.

# FRESHWATER SNORKELING TOOLKIT

## ► Snorkel Cleaning Station – Cost Estimate = \$15

You will need to clean the snorkels before and after each use.

- Two, one-gallon buckets should be available for this purpose.
  - *One bucket should contain concentrated bleach solution [one cup of bleach plus one gallon of stream water].*
  - *The other bucket is stream water.*
  - *The snorkel's mouth piece is swished in the bleach solution then rinsed in the stream water.*
- Please be sure to dispose of this solution in areas that do not harm wildlife or vegetation. Do not dump this mixture in the stream and consider bringing a closed container so that you can dump it in a designated waste water system.

## ► Other Miscellaneous Items Needed – Cost Estimate = \$150

- Thermometer
- Rescue throw rope
- First aid kit
- Portable radio (not included in cost estimate)
- Laminated fish pictures, posters, and identification charts. Some suggestions include:
  - *Fish-Watching in Progress sign. This sign can be displayed on a vehicle while the event is going on to let other people know what's happening and it helps answer questions from the public who are in the area.*
  - *Fish family poster showing the characteristics of each fish family found in the stream*
  - *Aquatic organisms posters to help participants identify other animals in the water*
  - *10 questions poster for school groups [a test to see if they can find all ten items in the water]*

**Total Startup Cost = \$6,550**



# APPENDIX B

## SUGGESTED PARTNER LIST

Working with partners is a great way to supplement the funding your snorkel program needs. When contacting potential partners, share that your aim is to get people outdoors, unplugged and learning about clean water. Many organizations offer grants or other funding opportunities to programs that get people outdoors. Talk to your Partnership Coordinator—Forest Service information can be found at: [www.fs.usda.gov/main/prc/home](http://www.fs.usda.gov/main/prc/home).

- ▶ United States Department of Agriculture - Natural Resources Conservation Service: this group is a good place to start as their objectives are similar to the Forest Service [www.nrcs.usda.gov/wps/portal/nrcs/main/national/contact/local](http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/contact/local)
- ▶ Local Conservation Districts [www.nacdnet.org/about/districts/directory](http://www.nacdnet.org/about/districts/directory)
- ▶ Local Resource Conservation and Development Councils [RC&Ds] [www.narcdc.org](http://www.narcdc.org)
- ▶ Department of the Interior - Fish and Wildlife Service [www.fws.gov/offices](http://www.fws.gov/offices)
- ▶ World Wildlife Fund [www.wwf.org](http://www.wwf.org)
- ▶ Freshwaters Illustrated [www.freshwatersillustrated.org](http://www.freshwatersillustrated.org)
- ▶ Conservation Fisheries, Inc. [Southeast] [www.conservationfisheries.org](http://www.conservationfisheries.org)
- ▶ Trout Unlimited [www.tu.org/conservation](http://www.tu.org/conservation)
- ▶ North American Native Fishes Association [www.nanfa.org](http://www.nanfa.org)
- ▶ The Nature Conservancy [www.nature.org/about-us/index.htm](http://www.nature.org/about-us/index.htm)
- ▶ NorthBay: an outdoor education program that runs river snorkeling trips throughout the eastern US, and residential outdoor education experience in the mid-Atlantic. [www.northbayadventure.org](http://www.northbayadventure.org)
- ▶ Local river alliances
- ▶ Local colleges and universities
- ▶ Local aquaria
- ▶ Local businesses. Emphasize that you are getting people outdoors and sharing a clean water message that is 'good public relations'.

Talk to school groups, Boy and Girl Scout Troops, 4-H, and Boys and Girls Clubs—while they may not have funds to contribute to your program, they may be interested in providing labor in exchange for snorkeling programs or community service credits.



# APPENDIX C

## CONFIRMATION LETTER TEMPLATE

### Dear FishWatcher—

Thank you reserving a trip with the [organization's name] Freshwater Snorkeling Program. We cannot wait to introduce you and your group to the wonders found in our local stream. Be prepared to be amazed by the biodiversity that a healthy watershed can support!

The [stream or river name] has an extraordinarily diverse assemblage of fish and other aquatic organisms. In the clear waters of the snorkeling site, it is typical to see [number of fish species present] species of fish on any given day. [Name a species to highlight] as large as [weight/length] of this species swim in schools in the deep pools; sporting fish, such as [name popular sporting fish] are seen in their natural habitats, giving anglers valuable insight for better fishing techniques. Colorful [name fish species] may be seen spawning and feeding. [Add additional wildlife to be seen such as turtles, tadpoles, salamanders!]

### Things to Know

Programs will start upon your group's arrival at the [stream or river name] site. Please arrive at the site on [date of the event and the time you want the group to arrive by], ready for a fun filled day. You can plan to be out of the water, changed and ready to leave the site by [enter expected end of event time]. Our guides will meet your group at enter your site name here. Detailed directions to the site are provided at the end of this letter. Please call if you have any questions or concerns about finding the snorkeling site.

Privacy tents will be set up for changing. The site has restrooms and a picnic area. Please bring your own drinking water.

A wetsuit, mask and snorkel will be provided to each participant along with instructions about their proper use. Your session will include information on aquatic ecology, fish identification, and the role public land managers play in protecting watersheds, streams, and the animals they support.

Participants must stay within the designated swimming area so we can ensure that you are safe at all times. Underwater viewing scopes (snoods) will be available for those not wishing to snorkel.

In the event of rain or cold air/water temperatures, you have the option to reschedule. Please understand that we are prepared to continue to conduct programs during light rain, air temperatures in the 70s, and water temperatures in the 60s.

Once again, we are so excited you chose to join us for a freshwater snorkeling program. Please do not hesitate to contact us with any questions or concerns you have. You can reach our knowledgeable staff at [enter contact phone and email information].

Sincerely,

[Program manager name, phone number and email]



# FRESHWATER SNORKELING TOOLKIT

**Enclose with your confirmation letter:**

**Your snorkeling Trip at a Glance, including:**

**Trip date:** [Enter the groups confirmed date]

\*Please provide us with a list of wetsuit sizes needed at least one week before your trip.

**Arrival time:** [date of the event and the time you want the group to arrive by]

**What to bring:**

- ▶ swim suit
- ▶ waterproof sunscreen
- ▶ wading shoes/strap-on sandals
- ▶ a towel
- ▶ lunch
- ▶ plastic bag for wet clothes
- ▶ drinking water
- ▶ waterproof camera (optional, but you'll probably wish you had one!)

**Directions to [enter your site name] here Snorkeling Site:**

[Make sure your directions are specific and include landmarks. A map to the site is very helpful. Many people are not familiar with driving on forest roads, so you need to be CLEAR and SPECIFIC. If GPS devices do not work well for finding your site, note that here. If your guides have cell phone access at the site, consider including a contact number.]

[Include a map if it helps with directions]

**Remember** – [Enter details here about parking and where to drop off/ leave vehicles or other items not to be forgotten]

For the online version of the toolkit, including fillable forms, please go to:  
<http://www.fs.fed.us/outdoors/naturewatch/tools/toolkits/snorkeling/>

FRESHWATER SNORKELING TOOLKIT

# APPENDIX D

## SAMPLE INVOICE

[Your Organization Name]  
[Contact information]

[Name of group or individual being invoiced]

Attn: [Name of contact (if a group)]

**Snorkeling Program on [name of your] River**

Program Date

[date]

Number of Participants

\_\_\_\_\_ @ \$xx.xx/person

**Total Due: \$\_\_\_\_\_**

Please make check payable to [your organization] and remit to above address at least 10 days before program date.

Thank you,

[Name of Person Invoicing]

[Title of Person Invoicing]

For the online version of the toolkit, including fillable forms, please go to:  
<http://www.fs.fed.us/outdoors/naturewatch/tools/toolkits/snorkeling/>

# APPENDIX E

## PHOTO CONSENT FOR ADULTS

### CONSENT/RELEASE

I hereby consent to the royalty-free use by the United States Department of Agriculture, Forest Service of photograph(s) taken of me by employees/representatives of the USDA Forest Service and of any reproduction of the photograph(s) in any form, in any media, for any purpose in connection with USDA Forest Service, world-wide, free and clear of any claim whatsoever on my part.

I also consent to the use with the photograph(s) of my name and any comments I may have made at the time of the photograph(s), including the editing thereof.

Furthermore, I understand that this consent includes consent to USDA Forest Service to use the photograph(s), with or without my name and any comments, for educational, promotional, and outreach purposes, and to use alone or in conjunction with other types of material, including use on the Internet and other means of public display.

I hereby release the United States, its officers, and employees from liability for any violation of any right I may have in connection with the foregoing use.

I hereby waive any right of inspection or approval of the photograph(s) or of the use that may be made of the photograph(s), my name, and my comment(s).

I am of legal age.

Signature \_\_\_\_\_ Date \_\_\_\_\_

*(Please Print)*

Name \_\_\_\_\_ Telephone No. \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

USDA Forest Service Photographer contact:

Name \_\_\_\_\_

Telephone No. \_\_\_\_\_

*USDA is an equal opportunity provider and employer.*

# APPENDIX E

## PHOTO CONSENT FOR MINORS (UNDER 18)

### CONSENT/RELEASE

I hereby consent to the royalty-free use by the United States Department of Agriculture, Forest Service of photograph(s) taken of me by employees/representatives of the USDA Forest Service and of any reproduction of the photograph(s) in any form, in any media, for any purpose in connection with USDA Forest Service, world-wide, free and clear of any claim whatsoever on my part.

I also consent to the use with the photograph(s) of my name and any comments I may have made at the time of the photograph(s), including the editing thereof.

Furthermore, I understand that this consent includes consent to USDA Forest Service to use the photograph(s), with or without my name and any comments, for educational, promotional, and outreach purposes, and to use alone or in conjunction with other types of material, including use on the Internet and other means of public display.

I hereby release the United States, its officers, and employees from liability for any violation of any right I may have in connection with the foregoing use.

I hereby waive any right of inspection or approval of the photograph(s) or of the use that may be made of the photograph(s), my name, and my comment(s).

Signature \_\_\_\_\_ Date \_\_\_\_\_

*(Please Print)*

Name \_\_\_\_\_ Telephone No. \_\_\_\_\_

Address \_\_\_\_\_

### CONSENT/RELEASE OF PARENT/LEGAL GUARDIAN

I am a/the parent/legal guardian of the minor who executed the foregoing Consent/Release. Acting both for myself individually and on behalf of said minor, I hereby consent to the execution of the foregoing Consent/Release by said minor and agree to the provisions thereof.

Signature \_\_\_\_\_ Date \_\_\_\_\_

*(Please Print)*

Name \_\_\_\_\_ Telephone No. \_\_\_\_\_

Relationship to Minor: \_\_\_\_\_

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

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# APPENDIX F

## SAMPLE SITE SAFETY PLAN

Safety of your snorkel program participants needs to your highest priority. This sample snorkeling site safety plan will help you to create your own comprehensive plan. Use the topics in this plan as an outline and add or remove items as makes sense for your program.

**In this plan, we identify possible hazards you may find at a snorkeling site. It is up to you to provide participants with what to do if a specific hazard presents itself.**



### AQUATIC RESTRICTIONS

- ▶ Boundary limitations
- ▶ Movement in the water
  - Use hands to pull yourself along in shallow water
  - Do the breast stroke in deep water to minimize splashing
  - No kicking or splashing – they stir up sediments and scare aquatic animals
- ▶ Kids should be in pairs or groups of three



### WATER HAZARDS

- ▶ Rocks are slippery, so swim or crawl
- ▶ Snakes and snapping turtles
- ▶ Leeches
- ▶ Deep water
- ▶ Swift water, currents and undertow
- ▶ Lightning and thunder
- ▶ Hypothermia
- ▶ Hooks, fishing line, ropes, glass, garbage



### TERRESTRIAL HAZARDS

- ▶ Animals
  - Bears
  - Snakes
  - Other vertebrates
  - Wasps, hornets and other stinging insects
  - Fire ants
  - Gnats and flies
  - People with bad attitudes
- ▶ Poison ivy/oak and thorny plants
- ▶ Slips, trips and falls
- ▶ Moving vehicles

**NOTE:** More safety tips regarding using the snorkeling equipment can be found in the [GETTING COMFORTABLE IN THE WATER](#) section of the toolkit.

# APPENDIX G

## SAMPLE JOB HAZARD SAFETY ANALYSIS

Forest Service Job hazard analyses (JHAs) are covered in the Forest Service Handbook 6709.II and 12. Your organization may have a different form or process to ensure safety; however, you may find the actions and instructions in this sample helpful.

Copies of this plan should be provided to crew leader(s) and 'home base' coordinators prior to leaving for the snorkeling event.

The following gives examples of what you might include for a job hazard analysis.

1. **Work Project/Activity:** Snorkeling
2. **Location:** Give your location such as "Cherokee NF"
3. **Unit:** Identify where this applies such as "all districts"

The 'heart' of the JHA is identifying hazards and abatement actions associated with various tasks or events. Below are hazards generally associated with conducting a snorkeling event:

### Motorized Vehicle

- ▶ Particulates (dust)
  - Employees shall drive with lights on at all times on gravel roads.
  - Drivers shall maintain a safe distance when following other vehicles on dusty roads.

### Snorkeling

- ▶ Drowning
  - Never snorkel alone.
  - Wear a wet suit for comfort and flotation.  
For large groups:
    - Post an observer and specify the boundaries of the snorkeling area.
    - Snorkelers will swim in pairs.
    - Instruct first time snorkelers and work with them until they are comfortable with the activity.
- ▶ Weather - Leave the water in the event of lightning or heavy rain.
- ▶ Temperature - Limit time in the water to meet local air and water conditions.

### Poison Ivy/Oak/Sumac and Noxious Weeds

- ▶ Poisonous Plants
  - Avoid changing clothes in areas with poisonous plants.

### Wasps and Hornets

- ▶ Insects and Animals
  - Alert everyone when wasps, hornets, or their nests are encountered.

# FRESHWATER SNORKELING TOOLKIT

## Venomous Snakes

- ▶ Insects and Animals
  - Crew members should be trained to recognize timber rattlesnakes and copperheads.
  - Alert all crew members when a poisonous snake is observed.
  - Do not handle poisonous snakes.

## Evacuation Plan

As part of the JHA, the Forest Service requires that an evacuation plan be submitted. The elements of that plan are:

**Project Name:** Snorkeling

**Work Site Location** (include legal description):

To prepare for an emergency which requires first aid, and/or immediate evacuation of personnel due to serious illness or injury, the following information should be predetermined, and available to all crew members:

**Designated first aid provider(s):**

(at least one person on each crew should be designated to provide first aid)

**Communication procedures to follow in the event of an emergency:**

Means of Communication:

Duty Hours:

Off Duty Hours:

(radio, cell phone, emergency position indicating radio beacon, etc.)

Radio Channel:

Phone Number:

Home Base:

Home Base Emergency Coordinator:

**Emergency Services:**

Ambulance provider and phone number:

Hospital and phone number:

## FRESHWATER SNORKELING TOOLKIT

Air evacuation should be obtained through the SO dispatcher, if needed.

Emergency evacuation travel routes: Attach map with roads for evacuation to main highway and to above hospital (and helispots, if appropriate) highlighted.

When calling for assistance, members of your snorkeling crew should remain in contact with home unit until evacuation team arrives, if possible. Members should provide the following:

- ▶ Nature of injury or accident. Do not broadcast victim(s) name(s);
- ▶ Type of assistance needed;
- ▶ Number, and (for air transport) estimated weight, of persons to be transported;
- ▶ Location of injured, using landmarks identifiable on ground and/or map;
- ▶ Current information about weather and travel hazards/obstacles.



For the online version of the toolkit, including fillable forms, please go to:  
<http://www.fs.fed.us/outdoors/naturewatch/tools/toolkits/snorkeling/>



# APPENDIX H

## GUARD CERTIFICATION

To ensure the safety of all participants, certified guides demonstrating skills in a way that is consistent with the regulations of your organization should be present to observe and, as needed, assist all participants. All Forest Service guides and personnel that snorkel while on the clock must be in compliance with FSH 4209.11- WILDLIFE, FISH, WATER, AND AIR RESEARCH HANDBOOK: CHAPTER 10 - DIVING AND SNORKELING SAFE PRACTICES 12.1:

The following minimum requirements must be met to be certified to participate in U.S. Forest Service snorkeling activities:

### 1. Individual Employee Requirements

- a. Current cardiopulmonary resuscitation (CPR).
- b. Current medic first aid (or equivalent).
- c. Demonstrate ability to do the following in a pool or confined water:
  - (1) Clear mask and snorkel.
  - (2) Swim 25 yards with a minimum of 4 breaths.
  - (3) Without swim aids, tread water for 5 minutes or 2 minutes without use of hands. (This is a standard in the American Academy of Underwater Sciences (AAUS) meaning: (a) Tread water normally (using hands and feet) for 5 minutes, or (b) Tread water only using your feet (no hands) for 2 minutes. [This is more difficult than normal treading.]\*\*Both option a and b are to be done without using any swim aids.)
  - (4) Buddy rescue techniques such as towing another person a distance of 25 yards in the water without the use of swim aids.
- d. Demonstrate knowledge of the following:
  - (1) Function, care, use, and maintenance of snorkeling equipment.
  - (2) Currents and waves associated with rivers, lakes, and beaches.
  - (3) Dangerous terrestrial and aquatic animals.
  - (4) Emergency procedures.

# FRESHWATER SNORKELING TOOLKIT

- (5) Planning and supervision of snorkeling operations.
- (6) Snorkel hazards.
- (7) Causes, symptoms, treatment, and prevention of the following:
  - (a) Near drowning.
  - (b) Exhaustion and panic.
  - (c) Hypothermia, hypoxia, and anoxia.
- e. Demonstrate knowledge and skills as identified in JHA.

## 2. Unit Documentation Requirements

- a. Document that the individual employee met the requirements in paragraphs 1a through 1e listed in section 12.1 as well as any snorkel related training completed beyond the minimum requirements.
- b. A JHA that at a minimum addresses environmental hazards (like currents, tides, invasive species, and so forth), wildlife hazards (terrestrial and aquatic), medical hazards (hypothermia, exhaustion, anoxia, hypoxia, drowning, and so forth), and local conditions (swift water, night, boats, depth, air/water temps, and so forth).
- c. Document emergency plan procedures.

## 3. Certification Maintenance

- a. Current medic first aid (or equivalent) and CPR.
- b. Recertification is required if inactive for more than 1 year.

## 4. Snorkel Procedure.

- a. Solo snorkeling for any reason is strictly prohibited.
- b. Refusal to snorkel:
  - (1) The decision to snorkel is at the discretion of each individual snorkeler. Snorkelers are authorized and have a duty to refuse to snorkel without fear of penalty, if in their judgment, conditions are unsafe or unfavorable, or if they would violate the precepts of training or the requirements of section 12 of this handbook.
  - (2) Each individual snorkeler has ultimate responsibility for their personal safety and the safety of those under their direct supervision.

# FRESHWATER SNORKELING TOOLKIT

c. **Termination of Snorkel.** Snorkelers are authorized to terminate the snorkel, without fear of penalty, whenever they believe it is unsafe to continue the snorkel, or continuation of the snorkel would compromise the safety of another snorkeler already in the water.

5. **Emergencies and Deviations.** Snorkelers are authorized to deviate from the requirements of sections 12.1 to the extent necessary to prevent or minimize a situation that is likely to cause death, serious physical harm, or major environmental damage. A written report of such actions must be submitted to the National Diving Program Manager and Diving Control Board explaining the circumstances and justifications.

6. **Snorkel Record Keeping and Reporting Requirements.**

a. **Record Maintenance**

(1) Unit diving safety officers shall maintain records for each respective Forest Service snorkeler and provide an annual snorkeling activity report to the regional diving safety officer.

(2) Files must include evidence of each snorkeler having met all requirements in section 12.1, any waivers, reports of disciplinary actions by the Diving Control Board, and other pertinent information deemed necessary.

b. **Accident Reporting**

(1) Report all snorkeling accidents resulting in serious injury to the Director, Office of Safety and Occupational Health, Diving Control Board, and the regional diving safety officer, in addition to the normal Forest Service accident reporting and notification requirements (FSM 6730).

(2) Regional diving safety officers shall record the occurrence of any snorkeling related injury or illness which requires hospitalization for 24 hours or more, or after an episode of unconsciousness related to a snorkeling activity. The report must specify the circumstances of the accident and the extent of any injuries or illnesses.

7. **Snorkel Revocations and Restrictions.** Failure of snorkelers to comply with agency requirements may be cause for restriction or revocation of Forest Service snorkeling certification.

# FRESHWATER SNORKELING TOOLKIT

## 8. Waiver of Snorkel Standards

a. Waiver of specific Forest Service snorkeling standards, such as training, examinations, and minimum activity to maintain certification, may be granted as long as employee safety and occupational health are not degraded or compromised.

b. Submit requests for waiver of Forest Service diving standards containing the following information in a memorandum to the Director, Office of Safety and Occupational Health:

(1) Description of the situation and identification of the Forest Service diving standard for which the waiver is being sought.

(2) Rationale why compliance is not possible or practical.

(3) Number of personnel to be involved on a regular basis, and any major items of Forest Service property to be involved.

(4) Interim measures or safeguards to be taken to ensure the protection of personnel, property, equipment, and including the public when affected.

c. Forest Service officials do not have authority to waive OSHA standards. Requests for such waivers must be initiated at the Agency level and submitted to OSHA by the Agency lead for OSHA approval.

## 9. Snorkeling Equipment.

a. Snorkelers shall wear apparel which provides appropriate thermal protection. Apparel will include fins or other appropriate foot protection (like wading boots).

b. Each snorkeler shall be equipped with a professional grade diving mask and snorkel.



## APPENDIX I

### TOPICS TO COVER AT STREAM SITE

In this section, you will find suggestions on how to structure your snorkeling day adventure to help participants get the most out of their experience.



#### REVIEW YOUR OBJECTIVES

Typically you would share objectives like:

- Raise public awareness of the significant aquatic animal diversity present in your watersheds.
- Explain why aquatic diversity exists and how fragile it can be [your watershed management].
- Explain the reasons for the recent increases/declines among aquatic groups.
- Show people what clean water looks like and the life forms that inhabit it.
- Make the link between healthy forests, clean water and healthy stream ecosystems.
- Share fish family characteristics for identification.
- Talk about water restrictions, drought, and the effects of climate change and runoff.



#### DESCRIBE THE SETTING

Include information such as:

- The number of native fish species that exist in your river's watershed.
- The number of native fish species that exist in other nearby/known watersheds.
- Comparison to well-known watersheds [for example, the Columbia River watershed supports 33 species of fish and the Colorado River supports 25 species].
- General information on other species, such as reptiles, mussels, snails, macro-invertebrates. How many are there, whether endangered, etc.
- Anything else that may impact or be unique to your river system [glaciation, ocean submergence, etc.].



#### TEACH THE VALUE OF WATERSHED MANAGEMENT

In simple terms, explain a watershed and your agency's mission. This may include:

- A watershed is a drainage basin - An area of land where all precipitation flows past one point
- The cleanliness of the water in a watershed depends on how well the land in it is managed.
- Explain the land base you manage (i.e., your agency manages most of the land encompassed by this watershed, or whatever the situation is)
- Simply explain your mission.

# FRESHWATER SNORKELING TOOLKIT



## DISTINGUISH THE THREE “SURFACE” FISH HABITATS

Share that different species of fish occur in three different habitats:

- ▶ Deep pool
  - Over seven feet deep
  - Slow moving water
  - Bedrock bottom with lots of crevices
  - Algae and organic sediment on rocks
- ▶ Glide (slow run)
  - Two to four feet
  - Slow flow without any choppy waves
  - Gravel and sand bottom
  - Algae and organic sediment on rocks
- ▶ Fast riffle
  - Less than two feet deep
  - Fast moving water – white water
  - Boulders and coarse gravel; no fine sediments
  - Algae on rocks



## DESCRIBE SUBSURFACE HABITAT FEATURES

Aquatic habitats are much more complex than you can imagine from your above water perspective. Fish have the same ecological habitat needs (food, shelter and reproduction) as terrestrial animals but it is difficult to see and understand how they are using these different habitats from above the water’s surface.

Our above water perspective, has led to aquatic habitats being classified based on what we perceive: pools, glides and riffles. The subsurface features, which are largely ignored, but are very important to aquatic organisms include:

- Stream bottom composition (sand, gravel, boulders, bedrock)
- Water velocity (swift, turbulent flow; swift straight flow; slow flow; and calm water)
- Water depth (deep - the surface flow does not reflect conditions in the water column; shallow – the surface flow is similar to the subsurface flow);
- Aquatic plants and logs (these features alter the current and provide shelter from swift flows and predators).

All of these features interact together to produce an infinite variety of “microhabitats”. One other “habitat feature” is created by some fish themselves and that is schooling. A school is a collection of similar fish (similar in both species and size) that move together. By forming these schools, individual fish become a part of a large group that confuses predators and provides them some protection.

# FRESHWATER SNORKELING TOOLKIT



## IDENTIFY THE FISH FAMILIES/GROUPS FOUND IN YOUR RIVER

It is helpful to have large pictures of the fish groups so you can show the main features that snorkelers are seeking. In addition, show spawning versus normal colors. For each show:

- The family name
- The features of that family
- Whether or not it is found in schools
- Which habitat it will use
- What it eats

Some examples are:

### **BASS**

- Features: Two dorsal fins; forked tail; long, slender body
- Schooling: Solitary, except striped bass
- Habitat: Deep pool, near cover
- Feeding: Insects/crayfish/fish

### **SUCKERS**

- Features: Single dorsal fin; mouth below snout; lips fleshy
- Schooling: White sucker and redhorse always school; hogsucker is solitary
- Habitat: Redhorse in water column of deep pool; hogsucker near bottom in glides and riffles
- Feeding: Insects sucked from the bottom

### **MINNOWS**

- Features: Single dorsal fin; mouth at end of snout; small body lacking spots
- Schooling: Always in schools; mixed species
- Habitat: Stoneroller and riffle minnow in fast riffles near stream bottom; shiners in glides up in water column
- Feeding: Stonerollers and riffle minnows eat insects and algae scraped or sucked off rocks; shiners and chub eat insects and detritus floating in the water

### **TROUT**

- Features: Single dorsal fin (plus adipose fin); body stream lined with spots
- Schooling: Usually solitary but may occur in loose groups
- Habitat: Water column of pools and glides; absent when water temperatures exceed 75 degrees F.
- Feeding: Aquatic and terrestrial insects

# FRESHWATER SNORKELING TOOLKIT



## PROVIDE DETAIL ON THE PRIMARY FISH FOUND IN YOUR RIVER

For example:

### **BASS AND BREEM (SUNFISH)**

Bass and bream eat crayfish, aquatic insects, and other fish. They may be eaten by birds (herons, osprey, kingfishers), larger fish, and mammals (otters).

Bass are usually solitary (largemouth bass) but some may school (yellow bass).

They like deep, slow flowing water with escape cover (logs or undercut stream banks).

Look for them in the deep pools and glides. They spawn in calm water with a sandy bottom and vegetation and logs nearby. The colorful males build nests by clearing fine sediments from a circular depression in the stream bottom. Often several nests will be located side by side with each having a male guarding it until the fry are large enough to swim away. Males are very protective of their nests and will return quickly if you scare them off.

Point your finger close to one of the males and he may “attack” you. Their teeth are too small to hurt you.

### **MINNOWS**

Minnows are the most abundant group present. They are mostly small (less than 6 inches) with notable exceptions: stonerollers (locally called “hornyheads”) which may get up to 9 inches.

Generally, minnows school together often with several species in a school. While different species may be present, they tend to sort into schools of similar size individuals.

Minnows are usually located in fast flowing water over gravel and boulders where they feed on any organic matter that floats near them. The stonerollers are, again, an exception to this feeding habitat. Stonerollers have a boney plate behind their lower lip that they use to scrape algae off rocks. Watch them in the fast flowing water as they smash into rocks, scraping and sucking the algae.

Many small-sized minnows are called “nest associates”. A large minnow will build a nest by carrying rocks in its mouth and piling them up. This activity creates the cleanest (silt-free habitat) in the river and draws many minnow species to the nest where they all spawn or feed on the eggs that have been deposited. The large nest builder tries to protect the nest but the number of minnows often overwhelms his attempts.



# APPENDIX J

## SAMPLE LESSON PLAN

The following lesson plan was developed by the Cherokee National Forest. Use this plan to help you think through elements to deliver at your snorkeling site.

**Objectives:** The training presented at the fish-viewing site is intended to:

- 1) Raise public awareness of the significant aquatic animal diversity present in Southeastern US watersheds;
- 2) Explain why this aquatic diversity is so great;
- 3) Explain the reasons for the recent declines among aquatic groups;
- 4) Discuss aquatic habitats; and
- 5) Discuss fish family characteristic for help identification to that level.

### I. THE SETTING

1. The Conasauga River watershed has 76 native fish species
2. The Citico Creek watershed has 65 native fish species
  - a. The much larger Columbia and Colorado River watersheds support 33 and 25 species, respectively
  - b. Mussels, snails, and macroinvertebrates also have great diversity
    - i. Mussels – originally 39 species; 26 present – 12 of which are federally listed
    - ii. Snails – originally 22 species; some genera extinct
    - iii. Macroinvertebrates – not well studied
3. Other watersheds in the Eastern United States have comparable diversity
  - a. Millions of years of geologically stable environment
    - i. No glaciations
    - ii. No ocean submergence
  - b. Time has allowed species to evolve, through competition, and to exploit finer niches

### II. WATERSHED MANAGEMENT

1. What is a watershed
  - a. Drainage basin
  - b. An area of land where all precipitation flows past one point
  - c. How clean the water is in a watershed is dependent on how well the land in it is managed.

## FRESHWATER SNORKELING TOOLKIT

2. The Cherokee National Forest manages most of the watershed above the point where you are standing
  - a. They try to keep the water as clean as possible
  - b. Actively manage the land for multiple uses
    - i. Sight seeing
    - ii. Camping, hiking, hunting and fishing
    - iii. Build roads and trails
    - iv. Harvest timber
    - v. Protect rare plants and animals

### **III. FISH HABITATS – DIFFERENT SPECIES OF FISH OCCUR IN DIFFERENT HABITATS**

1. Deep pool
  - a. Over 7 feet deep
  - b. Slow moving water
  - c. Bedrock bottom with lots of crevices
  - d. Algae and organic sediment on rocks
2. Glide (slow run)
  - a. Two to four feet
  - b. Slow flow without any choppy waves
  - c. Gravel and sand bottom
  - d. Algae and organic sediment on rocks
3. Fast riffle
  - a. Less than 2 feet deep
  - b. Fast moving water – white water
  - c. Boulders and coarse gravel; no fine sediments
  - d. Algae on rocks

# FRESHWATER SNORKELING TOOLKIT

## IV. FISH FAMILIES/GROUPS SHOW PICTURES OF SPAWNING COLORS VERSUS NORMAL

1. Bass
  - a. Features
    - i. Two dorsal fins
    - ii. Forked tail
    - iii. Long, slender body
  - b. Schooling – Solitary, except striped bass
  - c. Habitat – deep pool, near cover
  - d. Feeding – insects/crayfish/fish
2. Sunfish/bream
  - a. Features
    - i. Two dorsal fins
    - ii. Forked tail
    - iii. Large, flat, deep body
  - b. Schooling – solitary
  - c. Habitat - shoreline near deep pool
  - d. Feeding – insects
3. Darters and logperch
  - a. Features
    - i. Two dorsal fins
    - ii. Forked tail
    - iii. Small, torpedo shaped body
  - b. Schooling – Solitary or in pairs
  - c. Habitat – Bottom dweller; pools, glides and riffles
  - d. Feeding – Aquatic insects; logperch may flip rocks in searching for insects
4. Drum
  - a. Features
    - i. Two dorsal fins
    - ii. Rounded tail
    - iii. Very large, somewhat flattened, body
  - b. Schooling – Always in groups
  - c. Habitat – Deep pool, middle water column
  - d. Feeding – Snails and insects (crushed snail shells are usually from drum)

# FRESHWATER SNORKELING TOOLKIT

5. Suckers
  - a. Features
    - i. Single dorsal fin
    - ii. Mouth below snout; lips fleshy
  - b. Schooling – White sucker and redhorse always school; hogsucker is solitary
  - c. Habitat – Redhorse in water column of deep pool; hogsucker near bottom in glides and riffles
  - d. Feeding – Insects sucked from the bottom
6. Minnows
  - a. Features
    - i. Single dorsal fin
    - ii. Mouth at end of snout
    - iii. Small body lacking spots
  - b. Schooling – Always in schools; mixed species
  - c. Habitat – Stoneroller and riffle minnow in fast riffles near stream bottom; shiners in glides up in water column
  - d. Feeding – Stonerollers and riffle minnows eat insects and algae scraped or sucked off rocks; shiners and chub eat insects and detritus floating in the water
7. Catfish
  - a. Features
    - i. Single dorsal fin (plus adipose fin)
    - ii. Whiskers near mouth
  - b. Schooling – Solitary
  - c. Habitat – Bottom in pools and riffles
  - d. Feeding – Insects and detritus
8. Trout
  - a. Features
    - i. Single dorsal fin (plus adipose fin)
    - ii. Body stream lined with spots
  - b. Schooling – Usually solitary but may occur in loose groups
  - c. Habitat – Water column of pools and glides; absent when water temperatures exceed 75 degrees F.
  - d. Feeding – Aquatic and terrestrial insect

# APPENDIX K

## WETSUITS, MASKS & SNORKELS



### SUITING UP/ USING THE EQUIPMENT

#### WETSUIT

Be aware that some snorkelers may require a considerable amount of time to get comfortable with the snorkels. **NOTE: have participants go to bathroom before suiting up**

- ▶ Wetsuits should fit snugly – explain how a wetsuit works
- ▶ Guides should tell the participants:
  - Hold up the farmer john [or one piece suit] to find the right length
  - Make sure the suit is turned right side out [tag on inside]• Pull the wetsuit on carefully – don't tear the fabric
  - For the two-piece suits, explain the leg hole in the jacket

*NOTE: with the two-piece [overall and jacket combo] suits—the portion that includes the pants and looks a little like overalls is known as a 'farmer john'.*

#### MASKS

- ▶ Masks should fit tight – you should have marks on your face when you come out of the water
- ▶ Hair from head, beard or mustache may allow masks to leak
- ▶ Use the anti-fogging solution on inside lens
  - 2 or 3 drops per lens
  - Smear it all around on the lens
  - Rinse in stream
  - Reapply solution if masks fogs
  - Guides and life guard will each have a bottle of solution• They may use spit if solution is not readily available

#### SNORKELS

- ▶ Prior to using, rinse the mouth piece in a chlorine mix and then stream water buckets
  - Have a bucket containing a mixture of 1 cup bleach and 1 gallon of stream water.
  - Have a second bucket containing stream water
- ▶ Attach the snorkel to the mask

# FRESHWATER SNORKELING TOOLKIT



## GETTING COMFORTABLE IN THE WATER

Once the snorkelers are suited up and are comfortable with their masks and snorkels, they may enter the water. Have them:

- Kneel in the water.
  - Make sure they have the snorkel in their mouth properly and that the mask fits tight.
  - Practice breathing through the snorkel
    - ➔ *Emphasize trying not to breathe through the nose.*
  - Have them place their hands on the stream bottom and put their faces into the water continuing to breathe.
  - Once they are able to breathe through the snorkel with their faces in the water, tell them to push their feet back and allow them to float.
  - At this point, only their hands should be touching the stream bottom.
- ▶ Now, they are ready to see the wondrous underwater sights and to start pulling themselves about.

### Safety reminders:

- Sometimes people feel weird in a wetsuit, note that your balance can be thrown off.
- Have people get used to being in the water before they move around.
- Water may leak into the mask. Don't panic.
- Emphasize that if someone feels uncomfortable and might be in trouble, they should turn around and lay on their back. The wetsuit can help you float until help arrives. NOTE: wetsuits are not flotation devices; they only offer a slight increase in buoyancy that can aid in flotation.
- Continually assess everyone for hypothermia and interest level.
- The lifeguard should be looking at the big picture and making sure everyone remains accounted for at all times.
- Some people get panicked about breathing while using the snorkel.
- Understand the potential for these feelings and anticipate spending a little extra time working on calming techniques.

# FRESHWATER SNORKELING TOOLKIT



## CLEANING UP

Have everyone get out of the water and take care when removing the gear. You should have cleaning stations already set up for the wetsuits and snorkels and tarps laid out for participants to place the equipment on after they rinse it. The wetsuits, masks and snorkels all require slightly different cleaning processes:

- ▶ Wetsuits – Rinse suits in tubs with cleaning solution.
  - Fill tub about 1/3 full of water and squirt in about 2 tablespoons of cleaning solution.
  - Spread wetsuit out on provided tarp to dry.
- ▶ Mask – Rinse in the stream.
  - Do NOT use chlorine or wetsuit cleaning solution.
- ▶ Snorkel – Clean the mouth piece by rinsing in chlorine mix and then stream water buckets.
  - Have a bucket containing a mixture of 1 cup of bleach and 1 gallon of stream water.
  - Have a second bucket containing stream water.

*NOTE: Please be sure to dispose of this solution in areas that do not harm wildlife or vegetation. Do not dump this mixture in the stream and consider bringing a closed container so that you can dump it in your waste water system.*



For the online version of the toolkit, including fillable forms, please go to:  
<http://www.fs.fed.us/outdoors/naturewatch/tools/toolkits/snorkeling/>

# APPENDIX L

## SAMPLE OBJECTIVES & SPECIES LIST






The following objectives were developed for the Conasauga River on the Cherokee National Forest. They may help you develop the objectives you would like to achieve with your snorkeling program.

These objectives are placed on small cards with five on each side - so that each participant can have their own or work in groups of two or three. Instruct students to go back into the stream and find each of the objectives. The pictures (answers) and more information are on a separate poster available for everyone to see.






- Objective 1.** Observe the tadpoles, catch them if you can.
- Objective 2.** Observe the hogsuckers; watch them “vacuum” the stream bottom.
- Objective 3.** Observe the large drum and redhorse; listen to them “sing”.
- Objective 4.** Observe the tiger-striped Mobile logperch; watch it flip stones with its nose.
- Objective 5.** Observe the large schools of stonerollers; watch them scrape algae off rocks.
- Objective 6.** Observe a redbreast sunfish; see if it is guarding a nest site.
- Objective 7.** Observe a bass; how would you fish for them?
- Objective 8.** Observe the minnows; face down stream in a riffle; they may nibble on your fingers.
- Objective 9.** Observe a bronze darter; watch it dart from rock to rock.
- Objective 10.** Observe a turtle; be careful, they bite hard.



## FRESHWATER SNORKELING TOOLKIT

ITEM	IMAGE	SPECIES	LOCATION	COMMENTS
1		Bullfrog Tadpoles	Shallow water; sitting on the bottom; may be clustered	Fairly easy to catch but handle them gently
2		Hogsucker	Shallow water; on bottom; usually alone but may be found with stonerollers	Suck up organic matter from stream bottom
3		Drum & Redhorse Sucker	Largest fish in the area; in deep pools; usually in large schools	They often make a metallic clicking sound ("singing")
4		Mobile logperch	In slow current or riffles with coarse gravel bottom; usually alone	Feeds by flipping stones over with its nose
5		Stonerollers	Always in riffles; usually in very large schools	Feed by scraping algae off rocks; often "flash" as they turn in the water

## FRESHWATER SNORKELING TOOLKIT

ITEM	IMAGE	SPECIES	LOCATION	COMMENTS
6		Redbreast, longear, and bluegill sunfish	Always in calm water; usually near tree branches or boulders	Brightly colored males guard nests which look like bright, gravelly spots on the bottom
7		Spotted, largemouth, and redeye bass	Always in calm, deep water near tree branches or boulders; usually alone	Many young are present; large fish will seek cover when frightened
8		Many species of shiners	In large, mixed species schools in riffles; up in the water column	Face down stream in the riffle and they will swim close to your face
9		Many species of darters; bronze is the most common	Usually in the fastest riffles perched on rocks	When disturbed they will dart from one rock to another
10		Striped neck musk turtle; river cooter and snapping turtle	Calm water; among rocks or in nooks	They all bite

# APPENDIX M

## LIABILITY WAIVER EXPLAINED

The Forest Service and its employees, volunteers, and contractors are free from liability only when they are acting within the scope of their duties. This means any employee, volunteer, or contractor serving as a guide should have the duties associated with the snorkel program spelled out in their position descriptions or agreements, along with any required training (e.g. first aid, CPR, FSH 4209.11). The person supervising the guides should have in their position description language that indicates they will be involved with training or education or outreach or providing information to special interest groups or the public or something along those lines.

Liability waiver forms must be collected from participants for both fee and non-fee snorkel programs. An individual signature/witness page for every participant in the snorkel program. It is also important that each participant check the confirmation boxes at the top of the page themselves (i.e. don't autofill the checkboxes on the computer).

Minors (under 18) must have a parent/guardian sign the parent/guardian release before they can participate. For school groups this can be sent home ahead of time for signatures.

Participants need to sign the release on site, on the day of the event.

Two Forest Service employees, volunteers, or contractors must sign the release on the day of the event.

If a supervisor is on site they should also sign the day of the event; if not they should sign the release forms prior to the event. For regularly occurring events a Staff Officer or Forest Supervisor can sign a letter describing the purpose and scope of the activity, and the time period of the regularly occurring events (e.g. occurring every weekend between April 1st and August 31st). The intent is to make it clear that the supervisor is aware of the activity prior to the event happening.

We need to provide a reasonable standard of care to participants. At a minimum the guides must be first aid and CPR certified. Additional certifications such as swift water rescue or lifeguarding are needed when conditions at the snorkel site warrant additional precautions. Certified lifeguards are not needed for snorkeling in shallow streams and rivers. We do not need to post signs stating a life guard is not present unless the event is at a designated swim area.

## FRESHWATER SNORKELING TOOLKIT

People can still make a claim even if they sign the form, so documentation is key. The statute of limitations is 2 years, so keep the release forms on file for at least 2 years. There should be a clear plan in place on how to handle varying levels of incidents (minor vs. major injuries, etc.). If an incident occurs document it thoroughly on an accident report form and have an LEO make a report if needed. Do not rely on local law enforcement to complete an incident report, an LEO should be present if local law enforcement is present. Do not sign anything written by the participant or their representative without first consulting with OGC.



# FRESHWATER SNORKELING TOOLKIT

## Program Partners:



United States Department of Agriculture  
Forest Service

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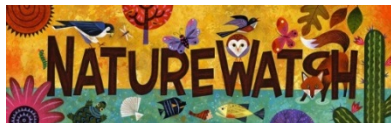
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<http://www.fs.fed.us/naturewatch>*