



Coastwatch

UNC SEA GRANT ■ SEPTEMBER 1989



A recipe for a healthy tomorrow

less salt ■ less fat ■ less cholesterol ■ more seafood

Please don't pass the salt

BY NANCY DAVIS

Joyce Taylor is shaking the salt habit. When the Sea Grant seafood education specialist is in the kitchen, she thinks twice before she reaches for the shaker.

And more often than not, she's cooking seafood without a grain of salt.

Instead, she tosses in a few well-selected herbs and spices to serve as substitutes.

"Salt is a habit. And I've always been a saltaholic," Taylor confesses. "But when I cut back on it, I was amazed at how good food tasted."

Taylor became convinced that salt could be eliminated from most seafood recipes without a loss of flavor after a year of experimenting in the kitchen.

She began the work because of the emphasis on reducing sodium in our diets. Contrary to popular belief, seafoods are actually low in sodium. But it's the salt we often add in the preparation that turns a food that's good for us into one that's not so healthy anymore.

And because she always touted seafood as *the* health food, Taylor wanted to be sure her recipes could withstand the scrutiny of health-conscious consumers.

Table salt is a combination of sodium and chloride. And it's the sodium that is actually the health concern.

We all need some sodium to live, but because it occurs naturally in so many foods, there's really no need to add it to our diet.

But most of us do.

In fact, much of the sodium we eat comes from ordinary table salt we use in cooking or sprinkle on at the table.

All the evidence isn't in yet, but most medical experts agree that we could all do with a lot less sodium.

The American Medical Association estimates that more than 19 million adults in this country have high blood pressure, a condition that increases the risk of heart attack, stroke and kidney failure.

Salt may not cause high blood pressure, but it can make the condition worse. That's why physicians often recommend their patients with high blood pressure and those with a family history of the disease restrict their sodium intake.

The American Heart Association goes a step further, recommending that everyone restrict salt consumption.

The Food and Nutrition Board of the National Academy of Sciences has established a daily intake of 1,100 to 3,300 milligrams of sodium as "a safe and adequate" range. Many experts suggest reducing this to 1,000 milligrams or less a day.

That's where Taylor figured she could help make a difference. "It may not do you any good to reduce your salt intake, but it certainly couldn't hurt," she says.

She began experimenting with low-salt seafood recipes a year ago. For help, she called on a group of health, food and nutrition leaders in Carteret County to serve as an expert taste panel.

The nutrition leaders represent extension homemaker clubs in the county. Taylor conducts monthly workshops with the leaders, who then pass on what they've learned to their clubs.

Taylor began by pulling seafood recipes from books, magazines and newspapers. Then she tried to adapt low-salt versions of the recipes.

"We weren't out to create new recipes," she says. "We just wanted to find a substitute for the salt."

At first, reaction to the healthier versions of the recipes was less than enthusiastic.

But, after a year of testing and retesting, Taylor is confident the recipes they ended up with are good—even if you're usually liberal with the salt shaker.

The first step in making the recipes healthier was to eliminate all table salt from the list of ingredients, Taylor says.

In the place of salt, Taylor substituted herbs, spices, citrus juices and table wines. Cooking wines weren't acceptable because they contained added salt.

Herb Chart

There are no rules for substituting herbs for salt in recipes. Here are a few suggestions. Don't be afraid to experiment.

BASIL	BAY LEAVES	CHERVIL	DILL	FENNEL	MARJORAM
Crab	Court Bouillon	Garnish or	Flounder	Bass	Clams
Mackerel	Flounder	Seasoning for	Grouper	Flounder	Crab
Salmon	Salmon	all Seafoods	Salmon	Grouper	Mackerel
Shrimp	Snapper		Scallops	Shrimp	Salmon
Snapper			Shrimp		Tuna
Trout					
Tuna					

There were no hard and fast rules for the substitutes. Instead, Taylor and her team of nutritionists used a trial-and-error method. They found that certain substitutes complemented some fish and shellfish better than others.

Some herbs that blended well with seafood included basil, bay leaves, dill, marjoram, oregano, parsley, rosemary, sage, tarragon and thyme.

Next, Taylor changed all butter in the recipes to unsalted margarine. Garlic powder or fresh garlic was substituted for garlic salt, and fresh minced celery took the place of celery salt.

Celery is one of the foods that naturally contains a high amount of sodium. But the quantities are still much lower than table salt. When added to a recipe, celery imparts much of that sodium flavor into the food, at a safer level.

If you're trying to cut back on salt, Taylor has plenty of advice.

Most important, read labels. Most packaged foods have the amount of sodium, in milligrams, printed on the label. Avoid processed foods since they are usually high in sodium.

Be aware that many seasonings are really nothing more than flavored salt. In lemon pepper, for example, salt is the first ingredient listed, meaning it's the most abundant ingredient.

When a recipe calls for a commercial seasoning blend, usually high in salt, mix your own, Taylor says. Try a blend of cayenne pepper, celery seed, nutmeg, coriander and paprika. A fourth of a teaspoon of each, with just an eighth of a teaspoon of cayenne, will serve just as well as the commercial blend.

Other commercial seasonings to avoid include: garlic salt, onion salt, commercial bouillon, meat tenderizers, soy sauce and monosodium glutamate.

If a recipe calls for crackers or bread crumbs, use the low-sodium versions that are available now.

Taylor admits that, in some cases, you'll have to compromise. One of the recipes she experimented with called for unsalted canned tomatoes. But the recipe got bad reviews.

So rather than give up on it, Taylor and her

nutritionists bent the rules a bit. They used 2 cups of unsalted tomatoes and 1 cup of salted tomatoes.

Getting rid of at least some of the salt is better than nothing, Taylor says. If you must, start by cutting back on salt, then work your way up to a total elimination, she says.

Taylor has compiled the successful no-salt recipes into a cookbook that will be available soon. The cookbook includes only the recipes that received an excellent rating from her taste panel.

For a flavor of the recipes in the book, Taylor offers these recipes. None of them contain any added salt—only what occurs naturally in the food or in small quantities in the ingredients. For your copy of the cookbook, write Sea Grant. Ask for *No-Salt Seafood*, UNC-SG-89-07. The cost is \$3.50.



Mackerel with Herb Seasoning

- ¼ cup unsalted margarine, melted
- 1 tablespoon fresh lime juice
- ⅛ teaspoon Tabasco sauce
- 1 tablespoon minced fresh parsley
- 1 teaspoon minced fresh thyme
- 1 teaspoon minced fresh marjoram
- ½ teaspoon pressed garlic
- ¼ teaspoon cayenne pepper
- ¼ teaspoon paprika
- ⅛ teaspoon ground cloves
- 4 medium mackerel fillets or other fresh fillets
- ½ cup coarsely chopped green onions, including tops

Combine melted margarine, lime juice and Tabasco sauce. In a small bowl, combine all other seasonings except onions. Place fillets in greased baking dish. Brush margarine mixture over fillets. Sprinkle onions on fillets, then herb seasonings. Bake at 400 F about 10 minutes or until fish flakes easily with a fork. Serves 4.

Broiled Snapper with Lemon Sauce

- 2 pounds fresh snapper fillets or other lean fillets
- 3 tablespoons fresh lemon juice
- 2 tablespoons unsalted margarine, melted
- freshly ground black pepper
- ¼ cup vegetable oil
- ½ teaspoon dry mustard
- 1½ teaspoons water

Place fillets in oiled baking dish or nonreactive pan. Brush with one tablespoon lemon juice. Brush with margarine and season with pepper. Broil 4 inches from heat for 10 to 12 minutes or until fish flakes easily when tested with a fork.

While fish is cooking, combine oil, mustard, water and remaining lemon juice. Blend well. Heat and pour over cooked fish. Serves 6.

Scallops over the Campfire

- 1 pound scallops
- ½ cup chopped mushrooms
- ¼ cup unsalted margarine, melted
- 1 teaspoon fresh lime juice
- freshly ground black pepper
- paprika

Pat scallops dry. Punch holes in heavy aluminum foil and place scallops on foil. Top with mushrooms. Pour margarine over. Sprinkle with lime juice, pepper and paprika. Grill about 10 minutes over hot coals until scallops are tender. Serves 4.

OREGANO

Clams
Crab
Flounder
Lobster
Oysters
Shrimp

PARSLEY

Garnish or
Seasoning for
all Seafoods

ROSEMARY

Mackerel
Salmon
Snapper

SAGE

Crab
Flounder
Salmon
Snapper

SUMMER SAVORY

Crab
Flounder
Salmon

TARRAGON

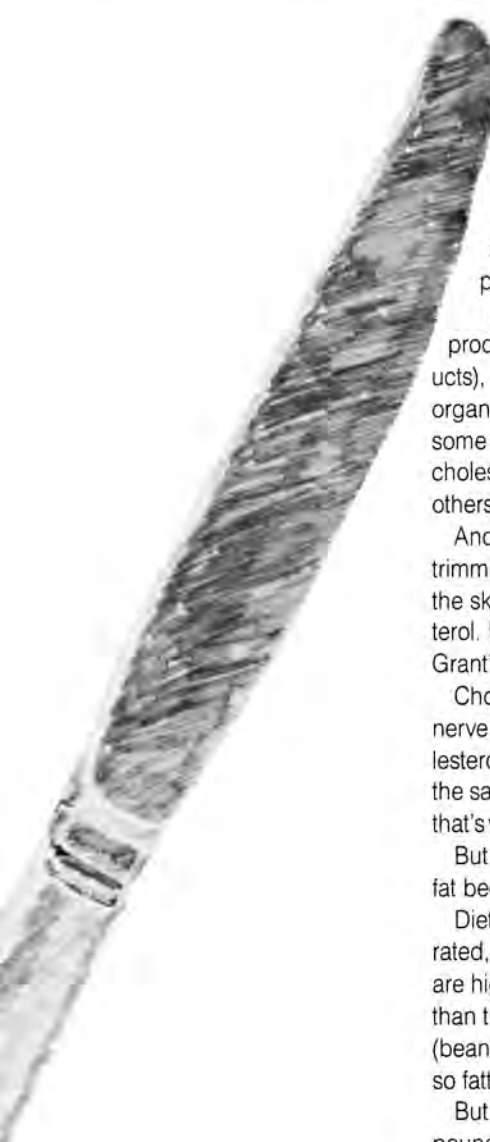
Crab
Flounder
Grouper
Lobster
Oysters
Shrimp

THYME

Crab
Flounder
Mackerel
Scallops
Snapper
Tuna

Cutting the fat and cholesterol

BY KATHY HART



Eat right. We hear it from the surgeon general, the American Heart Association, our physicians and, yes, our own mothers.

But what does it mean?

Generally, you should eat a variety of foods, but avoid too much fat, saturated fat, cholesterol and salt.

You know about salt (see story, page 2). But what about fat, saturated fat and cholesterol?

We hear or read these terms daily. But what do they mean to our health?

Cholesterol is a fat-like substance found naturally in the human body and in foods from animal sources. The cholesterol produced in our bodies is blood cholesterol. It is used every day in the production of hormones and the maintenance of cell structure.

But high levels of blood cholesterol increase the risk of heart disease. It leads to the buildup of fatty deposits on vessel walls and the narrowing of blood vessels. This keeps oxygen-carrying blood from getting to the heart, causing chest pain and heart attacks.

Dietary cholesterol is found in all animal products (meat, poultry, fish and dairy products), but is especially high in egg yolks and organ meats (liver, kidney and sweetbreads). For some people, the consumption of dietary cholesterol boosts their blood cholesterol; for others, it doesn't.

And many people mistakenly believe that by trimming away fat from red meat and removing the skin from poultry, they are eliminating cholesterol. But they are wrong, says Joyce Taylor, Sea Grant's seafood education specialist.

Cholesterol is found in the cell membranes and nerve fibers of animals. The concentration of cholesterol in the lean tissue and fat in meat is about the same. Since most meat is primarily lean tissue, that's where most of the cholesterol is concentrated.

But Taylor still recommends that folks cut away fat because it does reduce saturated fat.

Dietary fat comes in a variety of forms—saturated, polyunsaturated and monounsaturated. All are high in calories: nine per gram. That is more than twice the calories found in a gram of protein (beans) or carbohydrates (pasta). That's why fat is so fattening.

But fat can do more than just add a few extra pounds to your weight. Saturated fat, fat that is solid at room temperature, actually stimulates the production of blood cholesterol in your body.

In fact, saturated fats are believed to be more likely than dietary cholesterol to raise the blood

cholesterol in your body.

Some people mistakenly equate saturated fat with only animal fat. Animal fat (meat fats and butter, cream, whole milk and some cheeses) is high in saturated fat, but so are some vegetable oils.

Palm kernel oil, palm oil, cocoa butter and coconut oil, vegetable oils widely used in crackers, chips, cookies, cake mixes and granola bars, are more highly saturated and more harmful to your health than beef fat.

Polyunsaturated oils are liquid at room temperature and vegetable in origin. Corn, cottonseed, soybean, sunflower and safflower oils are high in polyunsaturates. Monounsaturated oils are soft at room temperature and also vegetable. Canola and olive oils are high in monounsaturates.

Polyunsaturated and monounsaturated oils are thought to lower blood cholesterol, but some scientists have recently disputed their healthful effects. Now, scientists believe the real key to lowering cholesterol levels is omega-3 fatty acids. Omega-3s are most abundant in the oils of fish and shellfish, particularly oily, fatty fish.

The presence of omega-3s is one reason the American Heart Association recommends that Americans eat seafood two to three times a week. And the association still recommends polyunsaturates and monounsaturates over saturated fats.

But when it comes to some polyunsaturates, there's a problem. Food companies often hydrogenate polyunsaturated oils in a process that solidifies or partially solidifies them. This renders these ingredients more saturated. But hydrogenated polyunsaturated oils are still less saturated than coconut or palm kernel oil.

And there's another complication. No vegetable oil is 100 percent polyunsaturated or monounsaturated. All contain some saturated fat.

So how do you choose an oil? Look for oils that

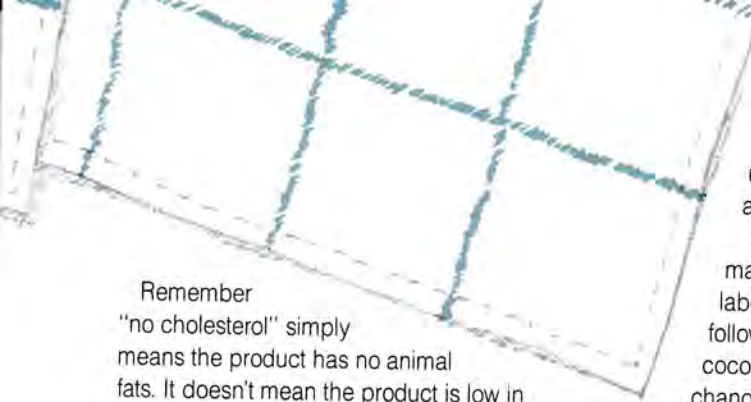
Unsaturated/Saturated Fat Ratios for Vegetable Oils

Canola	15.7/1
Safflower	9.6/1
Sunflower	8.6/1
Corn	6.4/1
Soybean	5.9/1
Olive	5.8/1
Peanut	4.6/1
Sesame seed	4.4/1
Cottonseed	2.7/1
Palm kernel	0.2/1
Coconut	0.1/1

Source: Tufts University
Diet & Nutrition Letter

have a high unsaturated/saturated fat ratio. Canola oil, now proclaimed the healthiest oil on the market, has the best unsaturated/saturated fat ratio: 15.7/1 (see table for other ratios).

When buying snack or processed foods, look beyond the "no cholesterol" or "vegetable oil" claims prominently displayed on the package.



Remember "no cholesterol" simply means the product has no animal fats. It doesn't mean the product is low in saturated fat. In fact, if palm kernel or coconut oil is among the ingredients on the label, the product is high in harmful saturated fats.

And don't be fooled by "vegetable oil" claims. Coconut, palm kernel and palm oils are vegetable oils, but they're also high in saturated fats.

Manufacturers use these saturated vegetable oils because they don't easily go rancid or impart an off flavor. And it's often cheaper to buy palm oil from Third World countries than to buy the

unsaturated oil crops of corn, soybean and cottonseed from U.S. farmers.

But food oil prices fluctuate, and sometimes manufacturers buy domestic oils. That's why labels often read: "contains one or more of the following: soybean, cottonseed, palm and/or coconut oil." This eliminates the expense of changing labels when manufacturers switch oils, but it leaves consumers in a quandary about the foods they eat.

All in all, the American Heart Association recommends a low saturated fat, low cholesterol diet for everyone.

The association suggests limiting dietary cholesterol to no more than 300 milligrams a day. And people are encouraged to reduce total fat intake to 30 percent of their total daily calories and consumption of saturated fat to less than 10 percent.



Eat seafood to your heart's content

BY KATHY HART

All of this talk about fats and cholesterol should send folks running to the seafood counter. Why?

Because all seafood is low in fat and saturated fat, and most is low in cholesterol.

For instance, compare the fat and saturated fat in 3½ ounces of cooked ground beef (82 percent lean), light meat chicken, gray trout and shrimp in Table 1.

The seafood clearly falls at the bottom of the chart in fat and saturated fat content. This translates into fewer calories and less cholesterol in the bloodstream.

When it comes to cholesterol, finfish and most mollusks (clams, oysters, mussels and scallops) are low in cholesterol. But blue crab, shrimp and lobster are higher (see Table 2). And squid and fish roe are even higher.

That's why the American Heart Association recommends that folks on low cholesterol diets limit their intake of shrimp, blue crab and lobster to once a week.

All shellfish were once thought to be high in cholesterol, says Joyce Taylor, Sea Grant's seafood education specialist. But recent advances in analytical equipment allowed scientists to measure only cholesterol. As a result, the cholesterol count for oysters, clams and scallops dropped significantly.

But Taylor says that consumers should also consider the size of their servings. The cholesterol counts in Table 2 are for 3½-ounce servings. "No one eats only 3½ ounces of shrimp or blue crab," Taylor says. "That amount only whets your appetite. Most people eat twice or three times that amount, and they're consuming two to three times as

Table 2.

Cholesterol in milligrams per 3½ oz. cooked portion

chicken livers	745
calf liver	440
2 large eggs	428
brown shrimp	157
blue crab	120
ground beef (82% lean)	100
loin pork chop	91
chicken, light meat	85
croaker	54
flounder	50
red snapper	40
scallops	40
mullet	21

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Table 1.

Fat Content in grams per 3½ oz. cooked portion.

	FAT	SATURATED FAT
cheddar cheese	31.4	2.1
ground beef (82% lean)	16.8	7.0
2 large eggs	11.2	3.4
loin pork chops	10.4	3.6
top round steak	6.9	2.5
canned white tuna	6.4	
chicken, light meat (without skin)	4.5	1.3
mullet	2.9	1.1
gray trout	2.8	1.1
bluefish	2.0	
clams	1.7	0.3
shrimp	1.4	0.2

Sources for Tables 1 and 2: National Marine Fisheries Service, U.S. Dept. of Agriculture and J.A. Nettleton's *Seafood Nutrition*

much cholesterol."

Taylor says folks also add saturated fat, cholesterol and calories to their fish and shellfish during preparation. She discourages frying the fisherman's catch, but realizes that some people are hooked on fried fish.

If you must fry, Taylor recommends canola oil or safflower oil. Try to avoid shortening or lard because they are high in saturated fat.

Be sure to heat your oil before adding the fish, Taylor says. The fish cooks faster and absorbs less oil.

Also, Taylor suggests that fried fish addicts use fillets for frying instead of cutting fish into fingers. With fillets there is less surface area to absorb oil.

And any time you fry, drain your fish on paper

towels to absorb more oil from the surface.

But Taylor wishes everyone would throw out their frying pan when it comes to fish and shellfish. Other cooking methods—baking, broiling, poaching, steaming, grilling and stir-frying—make for more moist, more flavorful fish that has fewer calories and saturated fat.

Poaching and steaming fish in water or wine requires no oil. For baking, grilling and broiling, Taylor recommends brushing the fish with canola oil instead of butter or margarine.

And marinades are a good way to add flavor without adding too much fat.

Taylor says the following recipes are healthful ways to prepare the catch.

Oriental Fish Marinade

1 pound flounder or other lean fillets
6 tablespoons light soy sauce
1 tablespoon vegetable oil
1 teaspoon finely minced fresh ginger
1 clove garlic, pressed
1 teaspoon honey
1 teaspoon vinegar
2 tablespoons water

Place fish in a flat, nonreactive pan. Mix other ingredients in a bowl and pour over fillets. Marinate 30 minutes. Remove fish and reserve marinade.

Grill or broil fish about 4 inches from heat source until fish flakes easily when tested with a fork, about 8 to 10 minutes. Baste occasionally with marinade. Serves 3.

Grilled Herbed Sea Bass

8 sea bass or other fillets
vegetable oil
freshly ground black pepper
1 tablespoon finely chopped fresh basil
1 tablespoon finely chopped fresh thyme
6 tablespoons finely chopped fresh parsley
1 cup coarse dry bread crumbs

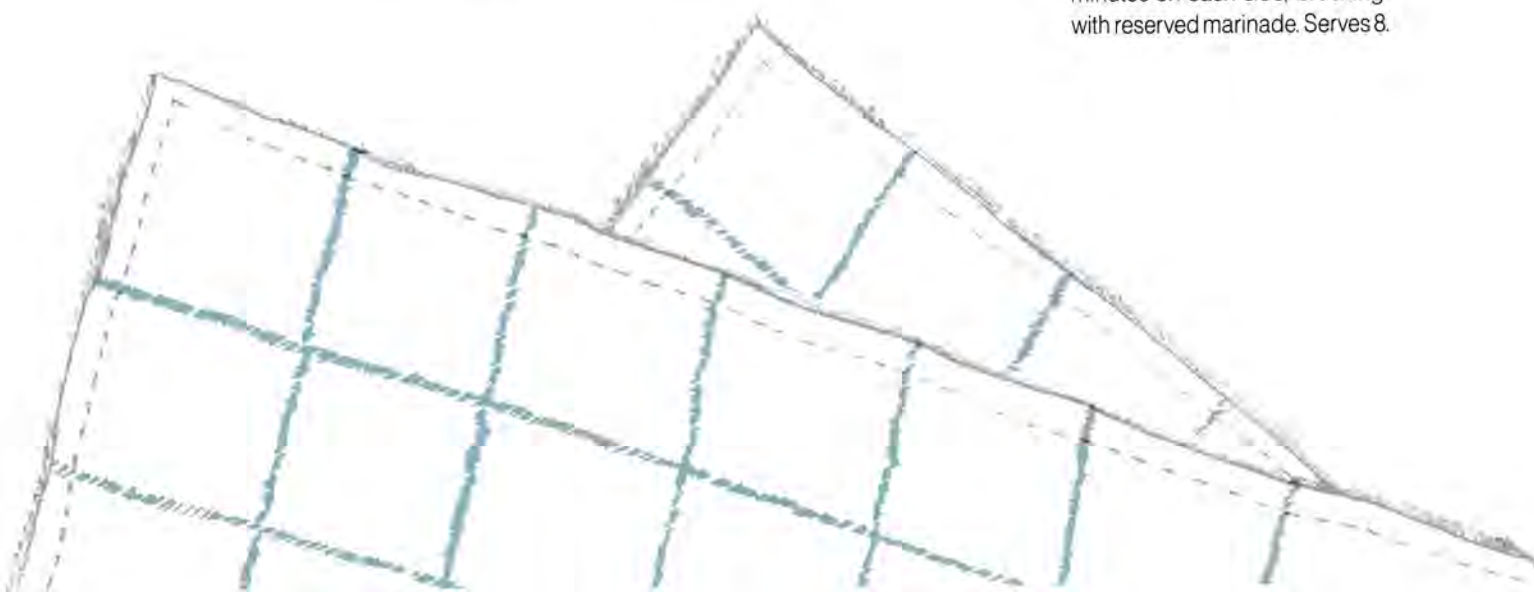
Brush fillets lightly with oil and sprinkle with pepper. Combine other herbs in a bowl. Press a coating of herbs, then bread crumbs, firmly into the fish on both sides. Transfer fish to an oiled, hinged grill. Grill over hot coals for about 4 to 5 minutes or until the crumbs are brown on one side. Turn carefully and cook on other side. Serves 8.

Indonesian Grilled Shrimp

2 tablespoons fresh lemon juice
1 tablespoon fresh lime juice
¼ teaspoon cayenne pepper
½ teaspoon ground coriander
3 tablespoons molasses
1 large garlic clove, pressed
2 teaspoons grated lemon peel
2 tablespoons vegetable oil
2 pounds shrimp, peeled

Stir together all ingredients except shrimp. Place shrimp in marinade for 30 minutes, turning occasionally.

Remove shrimp from marinade and thread them on metal or wooden skewers. (If using wooden skewers, soak them in cold water for 1 hour before grilling.) Reserve marinade. Grill about 4 inches from hot coals until lightly browned, about 4 minutes on each side, brushing with reserved marinade. Serves 8.



The Back Page

"The Back Page" is an update on Sea Grant activities—on research, marine education and advisory services. It's also a good place to find out about meetings, workshops and new publications. For more information on any of the projects described, contact the Sea Grant offices in Raleigh (919/737-2454). For copies of publications, write UNC Sea Grant, Box 8605, NCSU, Raleigh, N.C. 27695-8605.



On again, off again, on again. That best describes the regulations governing turtle excluder devices, or TEDs, during the summer of '89.

The devices designed to expel sea turtles from shrimp nets stirred a hotbed of controversy.

And as a result, it has been a summer that has found Secretary of Commerce Robert Mossbacher in court and Gulf shrimpers blocking access to some ports in protest.

Environmentalists are pushing the federal government to enforce regulations that require shrimpers to install TEDs in their nets. They believe that without the TEDs, hundreds of endangered sea turtles will be caught in nets and drown.

But shrimpers say the same holes cut to expel turtles also allow their catch to escape. They say the shrimp escape is so great that it is putting them out of business.

To appease environmentalists and uphold the Endangered Species Act, Mossbacher reinstated the TED regulations, but with a few changes to appease fishermen, too.

The new regulations state that shrimpers must either use TEDs in their nets or participate in synchronized shrimping.

And what is synchronized shrimping?

It's a schedule of times when all shrimp boats without TEDs can and can't have their nets in the water. Tow periods last 105 minutes; rest periods, 30 minutes. Any boat towing for shrimp during the rest periods will be stopped to see if they are pulling TEDs.

The U.S. Coast Guard and the National Marine Fisheries Service enforcement officers are enforcing the regulation.

These regulations remain in effect until Sept. 7. Meanwhile, Mossbacher heads back to federal court to justify the new regulations.

So, stay tuned for the next installment of "As the TED Turns."



From North Carolina to Texas, fishermen say TEDs are losers when it comes to shrimp.

They claim all of the different TED designs expel turtles and lots of shrimp, too.

But Sea Grant agent Jim Bahen and Varnamtown netmaker Steve Parrish have been hard at work to correct this flaw.

The duo began their work with miniature TEDs in the Navy's flume tank—a test tank for ship and submarine designs. After hours of testing and yards of videotape, Bahen and Parrish came back to North Carolina with a better idea of how TEDs worked underwater.

That's when the changes began. Parrish modified his own design, the Parrish soft TED, and another design that used a metal grid to deflect the turtle out of the net.

Then Parrish and Bahen headed to Georgia for a real test aboard *The Georgia Bulldog*, a research and testing vessel operated by Georgia Sea Grant.

The TEDs were installed one at a time in a 65-foot, two-seam shrimp net, a standard net used for brown shrimp in North Carolina. As a control, no TED was placed in the other net towed by the trawl.

In nine tows alongside Georgia's shrimp fleet, the TED nets either netted as many or more shrimp than the control net without the TEDs.

"The modifications reduced shrimp loss significantly," Bahen says.

To prove how well the modified TEDs worked, Bahen placed an underwater video camera in the net. He now has footage that shows how the TEDs work underwater, how they reduce shrimp loss and how they expel turtles.

Bahen is assembling the footage into a video that he will have available to show fishermen early this fall. For more information about the modified TEDs or the video, call Bahen at 919/458-5498. Or stop by his office at the N.C. Aquarium at Fort Fisher.

Sea Grant marine advisory agent Jim Bahen has developed *Recreational Guide to Management of Fish in South Atlantic Waters*. The guide provides current biological data and the latest state and federal regulations for popular species of fish found off the North Carolina coast.

The one-page guide is a handy reference for any recreational fisherman.

For your free copy, write Sea Grant. Ask for UNC-SG-89-06. And when ordering, be sure to use the customer identification number that appears on your *Coastwatch*.



When students in the Australian Outback go to class, they don't take a bus or catch the carpool. They turn on the radio. Some youngsters from

kindergarten to middle school live so far out on sheep and cattle ranches that they can't go to school easily. So teachers broadcast lessons daily over the radio.

Seeing "The School of the Air" was just one fascinating adventure for 17 North Carolina teachers taking part in the Australia Institute July 6 to 26.

The three-week workshop in Queensland gave teachers the chance to learn how life Down Under compares to life back home. They investigated educational systems and ecosystems, explored the Great Barrier Reef, conducted experiments and discussed global environmental problems with Australian scientists.

One of the highlights was an afternoon watching wallabies feeding and preening, says Lundie Spence, Sea Grant's education specialist and one of the program's coordinators. Some of the native marsupials even had joeys in their pouches.

The teachers spent time snorkeling over different types of reefs from the fringing

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reefs off Orpheus Island to the patch reefs 30 miles offshore.

They visited Australian schools and saw "The School of the Air" in action. And they learned about environmental problems confronting Australians in Queensland such as deforestation, oil drilling in the Great Barrier Reef, rising sea level and management of fish and shellfish resources.

In addition, the Tar Heels tasted steak and kidney pies, talked with commercial fishermen, and yes, heard an occasional "G'day mate."

The program was sponsored by UNC Sea Grant, the University of North Carolina at Charlotte, and the Massachusetts Audubon Society. Ten teachers received scholarships for the trip from the N.C. Math and Science Educational Network.



Teachers can explore other worlds down under with a copy of *Coastal Geology*. The 121-page North Carolina Marine Education Manual takes a look at the geology and geography that make up the Coastal Plain.

The easy-to-use workbook was developed by public school teachers and university professors to help science teachers incorporate marine lessons into their curricula. The book is geared toward middle- and junior high school classes but can be adapted to other grades.

Coastal Geology covers plate tectonics, coastal plain sediments, continental shelf geology, barrier island and estuarine geology and ecology. Each section includes back-

ground reading and a comprehensive list of references and resources.

In addition, the book includes more than 25 classroom activities such as "Making Marine Fossils" and the "Plate Tectonic Puzzle."

For a copy, send \$3.50 to Sea Grant and ask for UNC-SG-78-14A.

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