

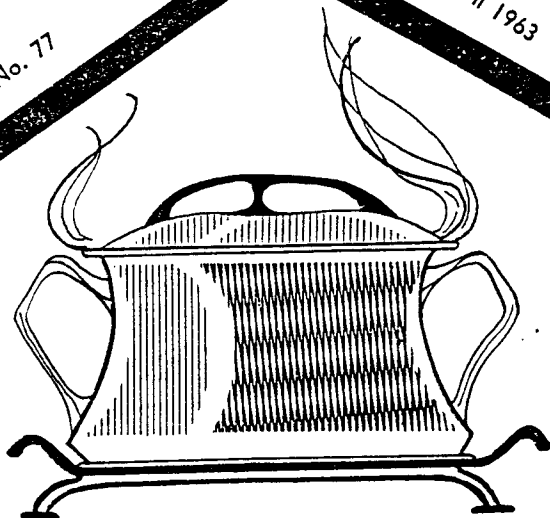
Nutria for

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LESLIE L. GLASGOW AND
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Home Use

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Agricultural Experiment Station
Charles W. Uppe, Director

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Nutria for Home Use

LESLIE L. GLASGOW AND LAVON A. MCCOLLOUGH

Introduction

Game animals have provided man with food since the beginning of time. Although their relative importance when compared with domestic animals has decreased, some game animals still provide large quantities of meat for human use. A new possibility is the nutria (*Myocastor coypus*), a vegetarian, which belongs to the same animal order as the squirrel. It is a newcomer in Louisiana. Nutria have increased in numbers in the state from a few animals in 1937 to an estimated three million in 1963. They have extended their range, naturally and with the aid of man, from a few acres near Avery Island to nearly all of the coastal area of the state and for long distances up inland watersheds. It is anticipated that the nutria will eventually occupy most of the marshy regions in the southeastern states and extend its range to the central section of eastern United States.

In 1960-61 the state-wide harvest for fur totaled approximately 800 thousand animals, with an estimated additional 100 thousand being discarded because of small size. Since adult dressed animals average about five pounds and sub-adult animals three pounds, this harvest represents a total of 4,300,000 pounds of nutria meat which was largely discarded or sold as animal food. If the trappers and landowners had realized one dollar and twenty-five cents per carcass, this number of animals would have yielded an income of over one million dollars above the value of the fur to persons harvesting the animals.

The nutria is utilized as food not only in South America, its native home, but also in European and Asiatic countries where it has been introduced.¹ Nutria growers on the west coast of the United States have processed some animals for human use by freezing as well as canning. Canned nutria is available in some delicatessen stores of the larger cities in the United States as a speciality item at a very high price. It is sold under various names, one being "ragondin," the French word for nutria. For the past few years occasional reports have been received from people in Louisiana who proclaimed that nutria meat is a fine food.

Because of the larger number of nutria and because of their potential value as human food, an experimental cooking program was initiated by the School of Forestry and Wildlife Management in cooperation with the School of Home Economics.

The objectives of the experiment were to determine: (1) suitability of nutria for human food, (2) proper methods of cooking nutria, and

¹Ashbrook, F. 1949. *Nutria grow in the United States*. U.S.D.I., Fish and Wildlife Service, Wildlife Leaflet 319, p. 14.

(3) acceptance of cooked nutria by humans. These objectives were accomplished by subjecting nutria, which had been cooked in various ways, to an edibility and acceptance test.

Funds for the project were provided by a grant from the Louisiana Wild Life and Fisheries Commission. Nutria used in the study were collected through the courtesy of landowners in the vicinity of Abbeville, Louisiana, with collections being made by Alan Ensminger, Fred Webert, Carlos Kays, and William Adams.

Research Procedure

Collection of Animals

Wild nutria were collected in the marshes of South Louisiana. All animals were shot at dusk in canals with a .22 rifle.

Dressing Animals

Nutria were processed for table use in a manner similar to that recommended for small game animals. Care in handling and cleanliness are of utmost importance. The nutria were dressed as soon as possible after collecting. Only healthy animals were utilized.

The general procedures that were followed in dressing nutria for experimental cooking are outlined below:

1. Animals were bled quickly and thoroughly.
2. Precautions were taken to avoid getting hair or dirt on the carcass during the skinning operation.
3. After skinning, the animals were hung by their front feet. A shallow cut was made on the belly side from the neck to the hind legs. All viscera were removed in one clean sweep by placing a hand behind the lungs and pulling downward. The body cavity was wiped out with a cloth. The liver was removed from the viscera and saved.
4. The tail, head, feet, damaged tissue, blood clots, fat, and hair were removed from the carcass.
5. The carcass was refrigerated immediately after dressing and kept cool.

Cutting Nutria into Serving Pieces

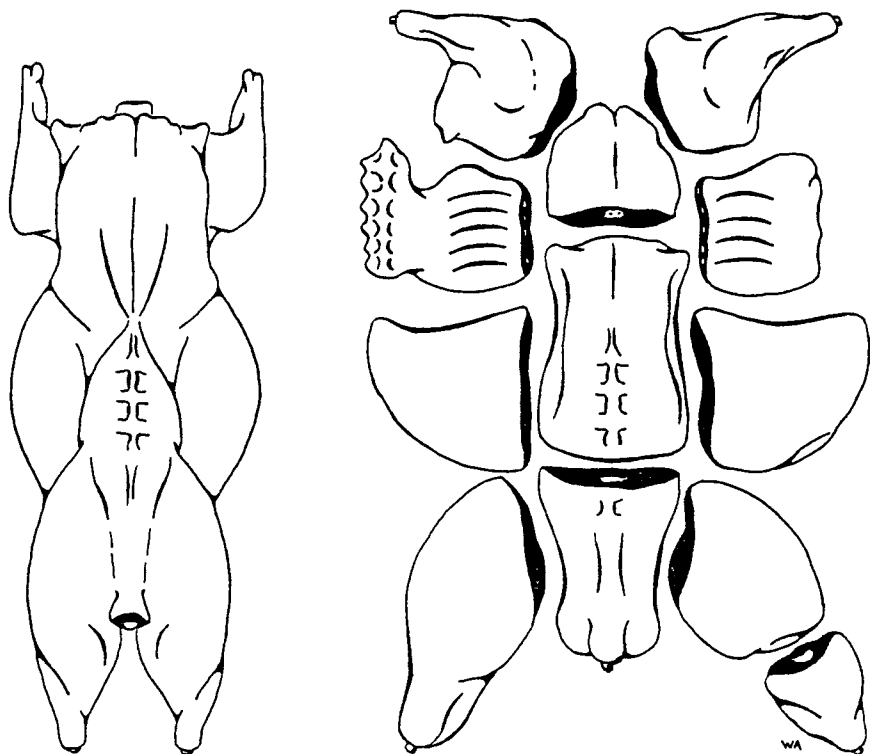
In most instances it was desirable to cut the carcass into serving pieces before cooking. The cutting procedure illustrated in Figure 1 was followed during this cooking experiment.

1. The fore and hind legs were cut from the carcass by leaving on them as much meat from the rib and flank sections as possible.
2. The hind legs were severed at the knee joints.
3. The ribs were cut from the backbone and discarded.
4. The large flat flanks (sides) were cut from the back.
5. The back of the animal was cut into three equal pieces.

Aging Animals

In any animal the tenderness of the meat varies with age. Since young

FIG. 1—NUTRIA CARCASS DIVIDED INTO SERVING PIECES.



animals are tender, they require a shorter cooking time to reach an edible condition, while older animals must be cooked longer or by different methods. Weight was used to distinguish young, sub-adult, and adult nutria. The following distinction was made in this study for age of dressed animals: Young—up to $2\frac{1}{2}$ pounds; sub-adult— $2\frac{1}{2}$ to $4\frac{1}{2}$ pounds; adults— $4\frac{1}{2}$ pounds or over.

Cooking

Nutria meat was used as a major ingredient in 22 recipes, most of which were patterned after standard methods of cooking game and domestic meats. All cooking was done in the Louisiana State University Home Economics kitchen under the direction of Mrs. Lavon A. McCollough. Temperature, time, and cooking methods for each recipe are shown later in this publication.

Serving

Meals were served cafeteria style in the Home Economics kitchen. Six "taste-testing" sessions were held at which volunteers from various university departments and a local sportsmen's club served as "tasters." All were informed that they were to be served nutria.

Normally three or four nutria dishes were prepared during each cooking period and served to a group of "tasters." Considerable care was taken to make sure that all dishes had an appetizing appearance. Usually a few extra food items such as coffee, fruit juice, crackers, or salad were served with each recipe in order to simulate a normal meal.

Smothered nutria was served to five of the six "tasting" groups enabling each person to sample meat that did not contain highly flavored seasoning. This plain recipe not only consistently rated high but also brought forth many favorable comments.

Testing

The 115 participants rated cooked nutria for flavor, tenderness, texture, and appearance using the scoring terms Excellent, Good, Fair, and Poor. A mimeographed rating sheet, as shown in Appendix A, was provided each individual for each method of cooking on which the above terms could be checked. Participants were urged to use additional space for any comments they cared to make.

Results of Testing

The number of ratings for each recipe varied from 7 to 19. Evaluations from the scoring sheets were converted to a numerical basis for comparative purposes by assigning the following values: Excellent—4, Good—3, Fair—2, Poor—1. The individual averages of all ratings for flavor, tenderness, texture, and appearance were computed for each recipe and also for all recipes combined (see Appendix B).

A tabular summary of these averages is as follows:

	<i>Range of averages for individual recipes</i>	<i>Average for all recipes</i>
Flavor	2.4-3.7	3.3
Tenderness	2.7-3.9	3.5
Texture	2.9-3.7	3.4
Appearance	2.9-4.0	3.5

An average of 4 for any characteristic was equivalent to an "excellent" rating and an average of 3 was equivalent to a "good" rating.

Since the averages for flavor, tenderness, texture, and appearance were 3.3, 3.5, 3.4, and 3.5 respectively, the "tasters" judged nutria to be a good to excellent food. Since all recipes received a consistently high rating, little preference was shown for an individual method of cooking. However, comments by the tasters indicated that there may have been a slight preference for deep-fat fried nutria and for nutria gumbo.

Suitability of Nutria for Human Food

Nutria are semi-aquatic animals. They are strictly vegetarians, eating the basal sections and sometimes the roots and stems of a great variety of plants. Compared with domestic animals, they are very sanitary in their feeding and living habits.

The School of Medicine at Tulane University and Louisiana State University were contacted in 1960 about the possibility of health hazards

that might be encountered from eating nutria. Dr. Paul C. Beaver, Professor of Tropical Diseases and Hygiene, Department of Tropical Medicine and Public Health, Tulane University, wrote: "There is no possibility of a parasite-health hazard in eating well-cooked nutria and there is no evidence that there would be greater risk in handling the uncooked meat of nutria than that of rabbit or squirrel." Stanley H. Abadie, Instructor, Department of Tropical Medicine and Medical Parasitology, Louisiana State University School of Medicine, wrote: "I see no health hazard from human consumption of nutria flesh when the animal carcass has been properly handled and properly cooked." Both domestic and wild animals harbor parasites which may be harmful to man. Since the nutria is a vegetarian, it harbors fewer parasites than many of the other animals that are commonly used for human food.

The prejudice held by some people against eating wild game is founded on little or no first-hand information of its desirability as food. The objections to eating nutria are nearly always based on the animal's appearance. Because the guard hairs are coarse, like those of a hog, the nutria is a grizzled, unattractive-looking animal. However, after being dressed, the carcass has an exceptionally pleasing appearance and looks very much like the carcass of a large rabbit.

Because of the absence of musk glands, the meat is free of the "gamy" flavor found in squirrels and rabbits. It is moist, fine grained, medium light in color, and firm but tender. It is one of the finest and one of the tenderest wild meats. "Tasters" stated that the texture and flavor resembled different meats; among them were chicken, frog legs, suckling pig, and rabbit. Some declared it had a very delicate flavor of its own. It is a highly versatile meat that can be fried, baked, smoked, pickled, or barbecued. It can be prepared in any manner that is suitable for other meats.

It may be desirable, although not necessary, to soak the flesh in salt water to aid in removal of blood. If this is done, soak the meat a few hours or overnight in the refrigerator. Some people prefer to soak game animals in vinegar, wine, or other marinating solutions. Since nutria meat has a mild flavor, soaking is not necessary to remove any "gamy" taste.

Energy values for nutria were determined in the Nutrition Laboratory of the Louisiana State University Home Economics Department by Ruby Whitehead. The figures compare closely with those given for rabbit and chicken.²

<u>3 1/2 ounces raw meat</u>	<u>Calories</u>
Nutria	122
Wild rabbit	124
Chicken (fryer), leg	112
Chicken (broiler)	151

²Bowes, A. D., and C. F. Church. 1956. *Food values of portions commonly used*. 8th edition, Philadelphia, Pennsylvania College Offset Press. 110 pp.

As far as is known, no values for other food nutrients in nutria meat have been determined. It is logical to assume that these values compare favorably with those for wild game as well as domestic animals. All meat is a good source of protein, and nutria is not apt to be an exception.

Although the following recipes were rated highly by the "tasters," it is recommended that the consumer make modifications to suit his taste. It is further recommended that the consumer try new recipes of his own.

The required cooking time varies with the age of the animal. Younger animals are not only more tender but are also more suitable for some recipes than older ones. Therefore, separate cooking methods are given for young, sub-adult, and adult animals.

Nutria will not normally have much fat. But if there should be excess fat on the carcass, it should be removed. In many instances there will be insufficient fat for cooking; therefore, when a cooking fat is desired, add oil, hydrogenated fat, lard, butter, or margarine.

The broth is weak and has little flavor. Bouillon, beef broth, or other commercial broths may be substituted. Cheese, mushroom sauce, or creamed soups are excellent when a sauce is needed.

Nutria Recipes

Young Animals (Up to 2½ pounds)

Broiled Nutria (young)

Broiling time:
25 to 30 min.

nutria cut in serving pieces
¼ pound butter or margarine
salt and pepper

1. Coat nutria generously with butter or margarine.
2. Place in shallow pan, with cut side of joints toward flame.
3. Broil at least 6 inches from flame.
4. Baste meat with butter or margarine as it becomes dry. When it has a good brown, turn and brown on opposite side. Continue basting.
5. Broil until tender. Test for tenderness by pressing end of leg with pot holder. Joints move easily if meat is tender.
6. Sprinkle with salt and pepper and serve at once.

Note: For a variation, after the nutria is done but before it is removed from the broiler, spread it with tomato sauce, mushroom sauce, grated cheese, or slices of processed cheese. Broil until the sauce or cheese is bubbly and slightly brown.

Deep-Fat Fried Nutria (young)

Frying time:
8 to 10 min.

nutria cut in serving pieces
batter for coating

deep fat for frying
salt and pepper

1. Simmer pieces from largest of young animals in salted water 3 to 10 minutes.
2. Heat deep fat to 375° F. or until hot enough to brown a one-inch cube of bread in approximately 40 seconds.

3. Dry pieces of nutria and dip in batter. (A recipe for batter follows, or use any favorite batter recipe.)
4. Fry in deep fat until golden brown.
5. Drain on absorbent paper and sprinkle with salt and pepper. Serve at once.

Note: A sauce or gravy may be served with the meat.

Batter for Coating

- | | |
|--------------------------------|-----------------------|
| 1 egg | 1 teaspoon salt |
| 1 cup milk | ½ teaspoon sugar |
| 1 cup sifted all-purpose flour | 2 teaspoons salad oil |
| 1 teaspoon baking powder | drop of tabasco sauce |

1. Beat egg and milk together in a bowl large enough to hold all ingredients.
2. Add flour and baking powder and beat with an egg beater until mixture is smooth.
3. Add other ingredients. Continue to beat until well mixed.

Note: The batter may be prepared and held in the refrigerator for several hours before using. If it separates, stir.

Chicken-Fried Nutria (young)

Frying time:
approx. 30 min.

- ½ cup milk or water
coating material such as
corn meal, flour, or cracker
crumbs
salt and pepper

1. Dip nutria into milk or water and shake well in a coating mixture. A shallow pan with a tight fitting lid or a paper bag is excellent for shaking the meat in the coating material.
2. Brown well on all sides in shallow fat over medium heat.
3. Season with salt and pepper and serve while hot.

Oven Barbecued Nutria (young)

Baking time:
approx. 60 min.
375° oven

1. Brush nutria generously with barbecue sauce. Place in shallow pan.
2. Place in oven. Baste frequently with additional barbecue sauce. Turn at least once during baking.
3. Bake until tender.
4. Serve with additional sauce.

Note: The barbecued nutria may be broiled as well as baked. Follow the directions under step 1, then broil at least 6 inches from the flame. Baste frequently. Turn at least once. Broil about 30 minutes.

Spit or Pit Barbecued Nutria (young)

1. Turn seasoned nutria over medium heat.
2. Baste with butter or any favorite barbecue sauce.
3. Smoke with hickory bark during last 15 minutes.

4. Barbecuing time can be varied from about 45 minutes to 2 hours, depending on the temperature of the pit.

Sub-Adult (2½ to 4½ pounds)

Smothered Nutria

(sub-adult)

nutria cut in serving pieces
flour

salt and pepper
fat

Cooking time:

1½ to 2 hrs.

1. Mix salt and pepper with sufficient flour to coat meat thoroughly.
2. Brown meat evenly in shallow fat over medium heat.
3. Add 2 to 4 tablespoons of water when meat is well browned. Cover pan tightly and turn heat to lowest position, or put meat and liquid in covered casserole and bake at 325°.
4. Cook meat until tender, adding more liquid if necessary. Use residual drippings in pan for gravy.

Note: Sliced onions may be added to nutria after browning.

Smothered Nutria with Milk

ingredients used above plus
½ cup rich milk or cream

1. Proceed as for the plain smothered nutria except add ½ cup of cream or ½ cup of rich milk in place of water if needed.
2. The gravy that forms as the meat cooks is delicious when served with the meat.

One-Dish-Meal Nutria (Sour Cream Nutria)

(sub-adult)

Cooking time:

1½ to 2 hrs.

nutria cut into serving pieces
flour

½ to 1 cup sour cream

salt and pepper

¼ cup catsup

fat for shallow frying

1 teaspoon sugar

1 medium onion, chopped fine or grated

1 tablespoon vinegar

½ green pepper, chopped fine

1 tablespoon Worcestershire sauce

1 clove garlic, chopped fine

1 small can mushrooms (no. 2Z)

1 package frozen peas

1. Mix salt and pepper with sufficient flour to thoroughly coat meat.
2. Brown meat evenly on all sides in shallow fat over medium heat.
3. Add all other ingredients, except peas; cover with tight fitting lid.
4. Simmer over low heat until meat is tender. If additional liquid is needed, add a little milk or water.
5. Cook peas in sauce or independently and add to the meat mixture about 15 minutes before serving.
6. Serve nutria in sauce in which it was cooked.

Note: 1. Canned mushroom stems and pieces instead of whole mushrooms are an excellent economy for any mixture of this type.

2. If sour cream is not available, sweet cream or undiluted evaporated milk may be used. Increase vinegar to 3 tablespoons or add juice of 1 lemon to mixture.

Spanish Nutria

(sub-adult)

Cooking time:
approx. 2 hrs.

nutria cut into serving pieces
flour
salt and pepper
fat for shallow frying
1 clove garlic cut fine
1 medium onion, cut fine or grated
½ green pepper, cut fine

2 teaspoons sugar
1 tablespoon vinegar
1 teaspoon Worcestershire sauce
1 can tomato paste
1 cup water
few drops tabasco sauce

1. Mix salt and pepper with sufficient flour to thoroughly coat meat.
2. Brown all sides of meat evenly in shallow fat over medium heat.
3. Add remaining ingredients. Cover and simmer over lowest heat until nutria is tender. If additional liquid is needed, add a small amount of water.
4. Serve nutria in sauce which forms during cooking.

Note: 1. Seasoning such as whole cloves, bay leaf, oregano, or stick cinnamon may be added if a spicy tomato sauce is desired.
2. Add ¾ cup of uncooked rice in step 3 to make Tomato-Rice Nutria. Increase the liquid by adding an additional can of tomato paste and an extra cup of water or by adding 2 cups of canned tomatoes.

Sour Nutria (pickled)

(sub-adult)

Pickling time:
approx. 24 hrs.

nutria cut into serving pieces
3 to 4 cups vinegar
3 to 4 cups water
½ cup sugar
1 large onion, sliced
1 tablespoon salt

1 teaspoon whole cloves
6 peppercorns
2 bay leaves
flour
fat for shallow frying

1. Place nutria in large bowl and completely cover meat with mixture made with equal parts of vinegar and water. Pickling mixture does not eliminate presoaking in salt water.
2. Add all other ingredients except flour and fat.
3. Cover bowl with a lid or waxed paper and allow mixture to remain in refrigerator for at least 24 hours.
4. Drain meat, saving vinegar mixture. Flour pieces generously and brown in shallow fat.
5. Add ½ cup of vinegar mixture, cover skillet or roaster, and simmer on lowest heat until tender (approximately 2 hours). If additional liquid is needed, add more of pickling mixture.
6. Thicken remaining vinegar mixture for a sour sauce to serve with nutria.

Baked Rice and Nutria (sub-adult)

Baking time:
approx. 3 hrs.
300° oven

nutria cut into serving pieces
flour
salt and pepper
fat for shallow frying
2/3 cup rice
1 cup water
3/4 cup celery, chopped fine

1/4 cup green pepper, chopped fine
3 medium onions, chopped or sliced
1 clove garlic, minced (optional)
2 teaspoons sugar
1 tablespoon Worcestershire sauce
1 tablespoon vinegar
1/3 cup catsup

1. Mix salt and pepper with sufficient flour to thoroughly coat meat.
2. Brown meat evenly on all sides in shallow fat over medium heat.
3. Put meat in heavy casserole that is large enough to hold all ingredients.
4. Brown rice in fat left from browning nutria. Add 1 cup water, cover pan with tight fitting lid, and simmer over very low heat 10 to 15 minutes.
5. Add rice to nutria.
6. Add all remaining ingredients and mix lightly.
7. Add water until it comes to top of nutria mixture. Cover with tight fitting lid. Bake until tender.

Note: 1. If a tomato flavor is desired, add tomato paste diluted with water, tomato juice, or canned tomatoes for the water in step 7.
2. Add 8 to 10 whole cloves and 1/2 bay leaf if spicy flavor is desired.

Roast Nutria (sub-adult)

Roasting time:
approx. 2 1/2 hrs.
325° oven

whole nutria
stuffing

1. Soak nutria in salt water but do not cut into serving pieces. Peel off all fat.
2. Rub inside of body cavity with salt and pack lightly with favorite stuffing.
3. Tie forelegs close to body and close top rib section with a skewer if necessary.
4. Use skewers to pull flanks and ribs together and lace with cord around skewers.
5. Rub outside of nutria with fat and roast in an uncovered pan with flank and rib side up.
6. Baste frequently with fat. If outside becomes too brown, cover top with clean cloth dipped in fat. Continue basting the cloth.
7. Roast until joints move easily when leg is pulled up and down.

(sub-adult)

approx. 3 hrs.

nutria cut into serving pieces
flour
fat for shallow frying
8 green onions, sliced (use good tops too)
1 large onion, chopped fine
8 sprigs parsley, chopped fine
2 cloves garlic, minced
1 sprig thyme
2 quarts water

1 bay leaf
2 teaspoons salt
1/2 teaspoon black pepper
1 can tomatoes (No. 2 or 2 1/2)
2 dozen shrimp, cleaned and cooked
1 can okra
1/2 red pepper, chopped fine, or tabasco
sauce to taste
1 pint oysters

1. Flour nutria and brown in shallow fat. As each piece is evenly browned, put in a large kettle or deep well.
2. Brown onions, parsley, garlic, and thyme in fat left from browning the nutria.
3. Prepare a roux using 2 tablespoons of fat and 2 tablespoons of flour. Add to nutria.
4. Add all remaining ingredients except oysters. Simmer over lowest heat 2 or 3 hours.
5. Just before serving add oysters. Simmer for a very few minutes, until oysters start to curl.
6. Serve with rice.

Nutria-Oyster Casserole (sub-adult)

Baking time:
approx. 60 min.
350° oven

nutria meat removed from bone
1 or 2 eggs
2 cups fine cracker crumbs
1 pint oysters

1/3 to 1/2 cup butter or margarine
1 cup rich milk
1/2 cup cream
1/4 teaspoon pepper

1. Remove from bone, 15 to 20 pieces of nutria, 1 to 3 inches by 1/2 to 1 inch. The back bone or fore and hind legs are preferable. Only part of one animal will be needed.
2. Beat egg slightly with 2 tablespoons of water. Add pepper.
3. Coat nutria pieces with fine cracker crumbs. Dip meat quickly in diluted egg and again coat with crumbs.
4. Brown each piece of meat in shallow fat.
5. Place browned pieces of nutria in a greased casserole. Fit oysters in with the nutria, distributing them evenly throughout the casserole. There will be more pieces of nutria than oysters.
6. Cover the meat mixture with milk and cream. Add any fat which remains from browning meat. For an especially rich casserole, add 2 or 3 additional tablespoons of melted butter or margarine. If this amount of liquid does not come to top of meat, add more milk or cream.
7. Sprinkle left over crumbs on top of casserole, and dot with butter.
8. Bake casserole until well browned and tender throughout.

Nutria-Bacon Rolls (sub-adult)

Baking time:
approx. 60 min.
325° oven

nutria meat removed from bone
2 to 3 cups fine cracker crumbs
salt and pepper

1 egg
shallow fat for frying
½ pound sliced bacon

1. Cut from bone solid chunks of nutria approximately 1 to 1½ inches thick. Meat from fore and hind legs is best.
2. Beat egg slightly with 2 tablespoons water.
3. Coat each piece of meat with cracker crumbs, dip in egg mixture quickly, then coat again with crumbs.
4. Brown each piece of meat evenly on all sides in shallow fat, using medium heat. Remove meat from skillet and cool enough to handle.
5. Wrap a strip of bacon around each piece of browned meat and fasten securely with a toothpick.
6. Place in open pan and bake until bacon is well cooked and nutria is tender.
7. Serve plain or with tomato or mushroom sauce.

Adult (4½ pounds plus)

Nutria Meat Loaf (adult pre-cooked)

Baking time:
approx. 1 hr.
350° oven

1½ pounds pre-cooked nutria, ground
(about 3½ cups)
2 medium onions, ground or chopped
fine
2 eggs
1½ cups milk
3 slices bread, broken fine

½ pound seasoned sausage
juice of 1 lemon or 2 tablespoons vinegar
1 tablespoon Worcestershire sauce
dash of tabasco
1 teaspoon salt
1 teaspoon powdered sage if desired
4 strips bacon.

1. Grind cooked nutria. Onions may be ground at same time.
2. Mix eggs, milk, and bread and beat together with egg beater.
3. Add all ingredients, except bacon, to egg mixture. Mix thoroughly.
4. Put in baking dish and lay strips of bacon across top.
5. Bake until thoroughly done, as this mixture contains raw sausage.

Note: 1. One-half cup of catsup may be added.
2. This meat loaf is good for cold sandwiches.

Cheese-Nutria Casserole (adult pre-cooked)

Baking time:
approx. 45 min.
375° oven

2½ cups cooked nutria
(bite size or larger)
5 tablespoons margarine or butter
½ medium onion, chopped fine
(optional)
¼ green pepper, chopped fine (optional)

1 teaspoon salt
½ teaspoon paprika
1½ cups milk
1⅓ pound American cheese
¼ cup dry bread crumbs

1. Melt 3 tablespoons of fat in a sauce pan. A double boiler may be used for this preparation.

2. Add onion and green pepper; cook in fat over direct heat until tender.
3. Add salt, paprika, and flour. Mix flour and fat into a smooth paste.
4. Add milk, gradually at first, stirring continuously so mixture does not lump. Cook over medium low heat. If double boiler is used, place top over hot water at this point.
5. Cook until mixture thickens. If double boiler is used, it will take longer for sauce to thicken. However, it will not need to be stirred continuously as over direct heat; also, it is less apt to lump and scorch.
6. Use either processed or regular cheese. Slice processed cheese but regular cheese must be grated.
7. Add cheese and stir until it melts in hot mixture.
8. Add nutria. Mix and pour into greased casserole.
9. Sprinkle buttered crumbs on top of casserole ($\frac{1}{4}$ cup of dry bread crumbs mixed with 2 to 3 tablespoons of butter or margarine).
10. Bake until casserole is bubbly.

Quick Nutria Casserole (adult pre-cooked)

Baking time:
approx. 45 min.
350° oven

- | | |
|---|-------------------------|
| 2½ cups cooked nutria (bite size or larger) | ½ teaspoon salt |
| ½ medium onion, grated | dash of tabasco |
| 1 can cream of mushroom soup,
undiluted | ¼ cup dry bread crumbs |
| | 2 tablespoons margarine |
1. Mix all ingredients together except margarine and bread crumbs.
 2. Pour into greased casserole.
 3. Mix margarine and bread crumbs, sprinkle over top.
 4. Bake until bubbly.

Note: Three stalks of celery chopped fine and $\frac{1}{2}$ green pepper chopped fine may be added, but they must be precooked in a *small* amount of water; otherwise they will not be cooked when the casserole is done. Add water in which they are cooked.

Macaroni-Nutria Casserole (adult pre-cooked)

Baking time:
approx. 45 min.
350° oven

- | | |
|--|-----------------------------------|
| 2½ cups cooked nutria (bite size or larger) | 1⅓ cup flour |
| 2 cups cooked macaroni
(about 1 cup uncooked) | 2½ cups milk |
| ¼ cup margarine or butter | 1 tablespoon vinegar |
| ½ medium onion, chopped fine | dash of tabasco |
| ½ green pepper, chopped fine | 1 teaspoon salt |
| 3 stalks celery, chopped fine | 1 teaspoon sugar |
| 1 small can mushrooms (optional) | ¼ cup dry bread crumbs |
| | 3 tablespoons butter or margarine |
1. Melt $\frac{1}{4}$ cup margarine in sauce pan.
 2. Add onion, green pepper, celery, and mushrooms (optional). Cook in fat until tender and lightly browned.

3. Add flour and make a smooth paste. Gradually add milk, stirring continuously to prevent lumping.
 4. Cook over low heat with constant stirring until thick. (A double boiler may be used. It will take longer, but mixture will not need constant stirring to prevent lumping.)
 5. Add vinegar, tabasco, salt, and sugar. Mix well.
 6. Fold in nutria and cooked macaroni.
 7. Pour into greased casserole. Mix dry crumbs and fat and sprinkle evenly over casserole. Bake until bubbly throughout.
- Note: 1. One cup cooked noodles may be used in place of macaroni.
 2. One-fourth pound of sliced process cheese may be added to sauce after mixture has thickened.

Nutria Salad Spread

(adult pre-cooked)

- | | |
|---------------------------------------|--|
| 2 to 3 cups cooked nutria, ground | 1 teaspoon sugar |
| 1 medium onion, ground | 1 teaspoon Worcestershire sauce |
| 3 to 4 stalks of celery, chopped fine | 1 tablespoon vinegar or juice of 1 lemon |
| 1/3 to 1/2 cup sweet pickle relish | dash of tabasco |
| or chopped sweet pickle | 1/4 to 1/3 cup catsup or chili sauce |
| 1/2 cup salad dressing | 1/4 to 1/2 cup milk |
| 1 teaspoon salt | |

1. Grind nutria and onion.
2. Add celery and pickle.
3. Mix salad dressing with remaining ingredients.
4. Combine mixture with meat.
5. Add additional salad dressing or milk if consistency is too thick. Add additional seasonings to taste.
6. Use as a sandwich filling.

Nutria Chop Suey

(adult pre-cooked)

Cooking time:
approx. 2 hrs.

- | | |
|-----------------------------------|--|
| 2 to 3 cups cooked nutria | 1 teaspoon salt |
| 3 tablespoons margarine or butter | 1 tablespoon Worcestershire sauce |
| 1 cup water | 2 tablespoons cornstarch |
| 2 chicken bouillon cubes | 1/4 cup cold water |
| 1/3 cup soy sauce | 1 No. 2 can bean sprouts |
| 1 to 1 1/2 cups chopped celery | 2 cups cooked rice or 1 can French-fried noodles |
| 1 onion, chopped | |

1. Bone nutria and cut in bite size pieces.
2. Brown nutria in fat.
3. Add 1 cup water, bouillon cubes, soy sauce, celery, onion, salt, and Worcestershire sauce. Cover pan with lid and simmer on lowest heat for 1 1/2 to 2 hrs. If mixture starts to stick, add a little more water.
4. Mix cornstarch and 1/4 cup water to form a smooth paste. Add to meat mixture, stirring constantly.
5. Add drained bean sprouts. Stir until mixture is hot.
6. Serve over rice or French-fried noodles with additional soy sauce.

- Note: 1. One can chicken broth may be added instead of water. Omit bouillon cubes.
2. One can sliced water chestnuts may be added with the bean sprouts.
3. One can mushrooms may be added with celery and onions. Broken stems and pieces are satisfactory.

Flanks

The flanks are thin and flap-like with no bone to give them structure. They average 6 by 8 inches and are about $\frac{1}{4}$ inch thick and are covered by a tough membrane. Because of their firmness and their awkward shape, they do not lend themselves to some of the recipes, particularly those for young animals. When the outer membranous covering is peeled from the flanks, they are very tender.

The flanks from the large animals weigh about one pound and are adequate for a preparation by themselves; or several flanks from the younger animals make a meal. Flanks are satisfactory when used in the recipes for adult animals, especially if the meat is ground.

Swiss Flanks

Cooking time:
approx. 2 hrs.

2 large or 4 small flanks
flour
1 teaspoon salt
 $\frac{1}{2}$ teaspoon pepper
fat for shallow frying

1 medium onion, chopped
 $\frac{1}{2}$ green pepper, chopped
1 cup canned tomatoes
 $\frac{1}{2}$ teaspoon sugar

1. Sprinkle salt and pepper over flanks. Cover generously with flour and pound well with a meat pounder or knife. Pound as much flour as possible into meat.
2. Cut flanks into several pieces if they are too large to handle easily. Brown in shallow fat over medium heat.
3. Add green pepper, onion, tomatoes, and sugar. Cover and simmer over lowest heat until flanks are tender.
4. Serve with sauce which forms as meat cooks.

Stuffed Flanks

Cooking time:
approx. 2 hrs.

2 large or 4 small flanks
flour
1 teaspoon salt

$\frac{1}{2}$ teaspoon pepper
fat for shallow frying
bread stuffing

1. Sprinkle salt and pepper over flanks. Cover lightly with flour and pound well with meat pounder.
2. Place mound of stuffing lengthwise through center of each flank. Pull edges of flanks together so that stuffing forms a roll or core completely surrounded by meat. Secure meat around stuffing with toothpicks or skewers, or tie with cord.
3. Brown each roll thoroughly in shallow fat over medium heat. When brown, add 3 to 4 tablespoons of water or milk. Cover pan with lid and simmer until nutria is tender. Additional liquid may

be added. Rolls may be baked in covered casserole in a 325° oven after browning.

4. Re-brown rolls under the broiler flame before serving if desired. Gravy may be made from the drippings left in the skillet or casserole.

Freezing Nutria

Nutria can be preserved for later use by freezing. Use only fresh, clean animals of high quality. The following recommendations are made for the preparation of nutria for freezing.

1. Wrap whole animal in moisture-vapor-proof freezer paper. Use a large sheet so that animal is wrapped without any breaks or gaps in paper. Pull paper closely around animal to exclude as much air as possible. Tie with cord or secure with tape. A stockinet can be pulled over paper to insure a close, tight fit.

2. The animal may be cut into serving pieces before wrapping. Almost all air can be excluded by carefully packing pieces of meat. If several animals are frozen at one time, pieces should be grouped according to the size, number, and use that is to be made of them. Wrap in same manner as for whole animal.

3. Place packaged meat in quick-freeze section of freezer. Freeze as quickly as possible and hold at 0° F. or below. Since the quality of all frozen meat deteriorates slowly, use within a six months period.

Canning Nutria

Nutria can be canned in the same manner as is used for small game or fowl. Do not attempt canning without a pressure cooker. Use extreme caution to make sure that all canning equipment is sterilized, that cooking is done properly, and that jars are adequately sealed. Canned nutria can be used in any recipe requiring pre-cooked meat or in cold salads.

Restrictions on the Harvest and Sale of Wild Nutria in Louisiana

Regulations regarding the harvest of nutria should be obtained from the Louisiana Wild Life and Fisheries Commission in New Orleans. If nutria are sold for human use, compliance must be made with all Board of Health requirements. These regulations are available from the State Board of Health in New Orleans.

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APPENDIX B

Scores Received by 20 Nutria "Dishes"

Recipe	No. of "Tasters"	Average Rating of Each Characteristic*				Average rating of all character- istics
		Flavor	Tender- ness	Tex- ture	Appear- ance	
Group I						
Cheese Casserole	10	3.6	3.6	3.5	3.7	3.6
Nutria Loaf—hot	10	3.4	3.9	3.6	3.6	3.6
Nutria Loaf—cold	9	2.4	3.7	3.4	3.3	3.3
Smothered	10	3.4	3.7	3.6	3.7	3.6
Group II						
Nutria-Rice	7	3.1	3.6	3.1	3.7	3.4
Broiled	7	3.3	3.1	3.3	3.1	3.2
Smothered	8	3.4	3.6	3.1	3.5	3.4
Group III						
Mushroom Casserole	10	3.5	3.7	3.5	3.5	3.6
Deep-Fat Fried	9	3.3	3.8	3.7	4.0	3.7
Smothered	9	3.6	3.8	3.6	3.4	3.6
Group IV						
Oyster Casserole	17	3.4	3.6	3.1	3.5	3.4
Barbecued	18	3.5	2.7	3.5	3.5	3.3
Smothered	19	3.4	3.2	3.4	3.5	3.4
Group V						
Gumbo	15	3.6	3.7	3.5	3.5	3.6
Bacon Rolls	16	2.8	3.1	3.3	3.5	3.2
Deep-Fat Fried	15	3.2	3.5	3.7	3.7	3.5
Group VI						
Sour Cream Smothered	15	3.3	3.7	3.3	3.5	3.4
Oyster Casserole	14	2.9	3.5	2.9	2.9	3.1
Deep-Fat Fried	15	3.7	3.5	3.6	3.9	3.7
Sandwich Spread	15	3.0	3.7	3.5	3.2	3.4
Average		3.3	3.5	3.4	3.5	3.4

*Numerical ratings are equivalent to the following:
Excellent—4; Good—3; Fair—2; and Poor—1.