A Guide to

DEVELOPING AQUACULTURE

in New Jersey

The New Jersey Department of Agriculture
Fish & Seafood Development Program
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www.state.nj.us/agriculture/rural/seafood/commfish.htm

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INTRODUCTION

In 1993, the Governor signed an Executive Order establishing the Aquaculture Development Task Force with a mandate to draft the State Aquaculture Development Plan for New Jersey. Members of the Task Force included the Secretary of Agriculture, and the Commissioners of the Departments of Environmental Protection, Economic Development, and Health. In addition, technical expertise was recruited from industry and academia by the Fisheries and Aquaculture Technology Extension Center (FATEC), a component of the Institute of Marine and Coastal Sciences at Rutgers University managed this initiative.

The Task Force identified the following objectives:

- To encourage the development and subsequent expansion of an aquaculture industry in a manner that protects natural stocks and their habitat.

- To stimulate private investment and enhance business opportunities in aquaculture.

- To ensure coordination among state agencies with jurisdiction over aquaculture and related activities.

- To address issues related to effluent discharge, product standards, marketing research and demonstration, training and outreach.

On August 31, 1997 the New Jersey Legislature adopted Title 4, Chapter 27 "The New Jersey Aquaculture Development Act". This Act was proposed and adopted in direct response to the Aquaculture Development Plan submitted by the Aquaculture Task Force. The Aquaculture Development Plan outlined impediments to the development of aquaculture in New Jersey. The New Jersey Aquaculture Development Act was adopted in an attempt to address these impediments. One of the key provisions of the Aquaculture Development Act was the adoption of applicable portions of the State Aquaculture Development Plan. In addition to the adoption of the plan, the act also sets forth very specific tasks to be completed by various State agencies, including the development of a guidebook to assist the potential aquaculturist in the development of their project.

The first part of this Guidebook will provide guidelines to help you complete your Application to the NJDA for an Aquatic Farmer License. In most cases, an applicant will fill out the Application during a person-to-person meeting with a representative from the New Jersey Department of Agriculture. This Guidebook can be used to supplement or replace that meeting, depending on the desires of the applicant.

The second part of this Guidebook provides more explanations of many of the important agricultural policies that are relevant to aquaculture in New Jersey. The third part covers a broad range of subjects such as physical/climatic conditions in the State; priority species for development in the State; potential financial assistance; and business plan development. Part four concentrates on aquaculture funding.

PART I: COMPLETING THE APPLICATION FOR AQUATIC FARM LICENSE

The following detail follows the Application questions, section by section.

APPLICANT INFORMATION *(page 3):* Your mailing address is where you currently reside (assuming that you do not have a facility or business address presently). If you do not have all of the information for this section, you may leave those areas blank.

If you are the **NOT** the landowner of your site, please explain your situation briefly below the 'Landowner' question and fill in the information on the landowner.

If you are working with a consultant or the contact person for this project is different from the person listed at the beginning of page 3, please fill in the appropriate information.

TYPE OF CULTURE *(page 4):* Please check the appropriate category. You may check more than one if your operation involves more than one type of culture.

- Name and origin of species *(page 4):* Fill in the information requested. For example: Yellow perch *(Perca flavescens) USA, Iowa, Aquatic Fish Farms, Inc. (315) 555-1234*

- ***Estimated Annual Production*** *(page 4):* Fill in the amount you hope to produce each year. For example: *100,000 pounds of yellow perch or 5,000 bushels of oysters*

GENERAL ACTIVITY DESCRIPTION *(page 4):*

- Please check one category for "Project Type" and fill in the date that you expect to begin construction.

- If you are unsure about local zoning laws, you should first contact the NJDA and determine if your community has regulations for the Right to Farm Act. The intent of the Right to Farm act is to afford the farmer protection against municipal regulations, which unnecessarily constrain agricultural operations and private nuisance suits. You may also contact the Zoning office or Land Use officer of your local municipality to inquire about zoning laws. The phone number of your local municipality can be found in the Blue pages of your telephone book.

- Fill in specific sections on 'Size of Operation' that apply to your project. If you are culturing shellfish on leased State bottom, you may indicate the size of your lease area by surface area (acres).

- Indicate your water source and how much you will take in and discharge per day. Discharge is any used water that may or may not be treated before exiting your facility. Check the box that indicates where the discharge will go. ***Note***: The amount of discharge is not measurable for some types of culture such as ocean or estuarine culture of fish or shellfish.

TYPE OF OPERATION (*page 5-6)*

The following 4 sections in the Application will ask you a series of questions about your operation. The sections are specific to the *TYPE* of operation you are planning.

ALL applicants must complete Section 4.

If you are unsure about the answer to any question in Sections 1-4, please check the **"?"** box.

Section 1: Culture in Ponds, Lakes, or Impoundments

Question	EXPLANATION
1	For example, check "yes" if your product is intended for consumption by humans or for feed for food animals. Answer "no" if you are raising fish for bait, biological/environmental research, or ornamental aquariums, etc.
2	Self-explanatory.
3	If there is no water entering the culture containment from a creek, spring, or other non-confined water source, ***and*** if no water is exiting the culture containment to another natural water body (creek, lake, river, etc.), check "yes".
4	Check "yes" if the culture area is prone to flooding that would result in culture water contact with a local surface water body during times of heavy rains.
5	Self explanatory
6	Predator control systems may include electric fences, netting, noise cannons, etc.
7	Self-explanatory.
8	Conservation refers to culturing fish to be eventually transferred to another water body ("stocking"), regardless of the intended final use of the transferred fish.
9	Wholesale food purpose means selling your product at the wholesale level, where it eventually reaches the retail consumer in a food market or restaurant, etc.
10	Self-explanatory.
11	Processing, with respect to fish and aquatic products includes any operation that involves handling, storing, preparing, heading, gutting, shucking, freezing, changing into a different market form, manufacturing, preserving, packing, labeling, or holding.

Section 2: Culture in Tanks or Raceways

Question	EXPLANATION
1	For example, check “yes” if your product is intended for consumption by humans or for feed for food animals. Answer “no” if you are raising fish for bait, biological/environmental research, or ornamental aquariums, etc.
2	Self-explanatory.
3	Recirculating aquaculture is often done indoors in tanks and raceways. The water is filtered mechanically and biologically before returning to the tanks. Most water is re-used.
4	If you answered “yes” to Question 3, write what the *total* volume of the system will be (for example, 100,000 gallons).
5	Flow-through systems may or may not filter water before it exits from the facility into a stream, settling pond, or other outlet. The water is not reused in the system.
6	Self-explanatory.
7	If “yes” for question 6, write in your projected total daily discharge amount. *Discharge is any used water that may or may not be treated before exiting your facility.*
8	If “no” for question 6, indicate where the discharge will go (settling pond, evaporation basin, sewer, etc).
9	Predator control systems may include electric fences, netting, noise cannons, etc.
10	Wholesale food purpose means selling your product at the wholesale level, where it eventually reaches the retail consumer in a food market or restaurant, etc.
11	Self-explanatory.
12	Processing, with respect to fish and aquatic products includes any operation that involves handling, storing, preparing, heading, gutting, shucking, freezing, changing into a different market form, manufacturing, preserving, packing, labeling, or holding.

Section 3: Culture of Marine or Estuarine Organisms

Question	EXPLANATION
1	Examples of molluscan shellfish are oysters, clams, mussels, snails, etc.
2	Self-explanatory.
3 & 4	Examples of other' might be zooplankton (rotifers, artemia), microalgae, macroalgae, or crustacean shellfish such as shrimp, lobster, crawfish, etc. If your operation involves a hatchery and you will be culturing live foods (those mentioned above, or other), please indicate those in your response.
5	Check appropriate system(s) if you are culturing shellfish.
6	Check appropriate system(s) if you are culturing finfish.
7	Self-explanatory.
8	Land-based refers to any culture facility that is located totally on land or an elevated structure (e.g. pier or dock) having containment walls that exceed in height the maximum extreme elevation of the adjacent natural water body, as opposed to a culture containment system that is suspended or immersed in a natural water body, and incorporates that water body as part of its structure.
9	Estuarine and marine waters include ocean, bays, and tidal bodies of water that have average salinities in excess of 1 part per thousand (ppt) at some stage of the normal tidal cycle.
10	Self-explanatory.
11	Wholesale food purpose means selling your product at the wholesale level, where it eventually reaches the retail consumer in a food market or restaurant, etc.
12	Processing, with respect to fish and aquatic products includes any operation that involves handling, storing, preparing, heading, gutting, shucking, freezing, changing into a different market form, manufacturing, preserving, packing, labeling, or holding.

Section 4: Additional Questions

Question	EXPLANATION
1-3	The purpose of these questions is to ascertain whether your aquacultural/agricultural operation satisfies the eligibility criteria for differential property taxation pursuant to the "Farmland Assessment Act of 1964". If you are eligible for differential property taxation, it may reduce the amount you are assessed for property taxes. If you are unsure how to answer them, please mark the "**?**" box. *For further information regarding the "Farmland Assessment Act of 1964", please call the New Jersey Department of Agriculture*
4	Cold water aquatic animals are those including, but not limited to the *Salmonidae f*amily (for example Trout, Salmon, Char).
5	The amount of feed that your fish will consume each month can be calculated based on your targeted yearly production and feed conversion ratio (FCR). *Your FCR is calculated by the kilograms of feed needed to produce 1kg of product. The lower the FCR, the more efficient the culture species is in converting feed to flesh. For example, a 2:1 FCR means that it takes 2kg of feed to produce 1kg of fish*. FCRs are affected by many variables including type of feed, type/size of species, culture system, and water quality. The amount of feed you are giving to your stock is dependent upon what stage of life they are in. Fry and fingerlings are given a higher percentage of their body weight *(Bwt*.) in feed (4-8% per day) than larger fish are (2-4% per day). To calculate the total amount of food your fish will consume during a month, take the total weight (in kg) and multiply this number by the percent body weight that you are feeding. The resulting number can be multiplied by the number of days in the month. For example, a farm has a calculated total fish weight of 10,000 lbs. If all fish are being fed 3% of their body weight per day, the calculation would be as follows: *Total Fish weight (lbs)* x *%Bwt of feeding* x *30 days/month= 10,000 X 0.03 X 30 = 9,000 pounds of feed per month.* **NOTE**: If different %Bwt. feeding is used for different size fish then each size and %Bwt. feeding needs to be calculated separately and then totaled.

6	Warm water aquatic animals are those including, but not limited to the families *Ameiuridae* (catfish), *Centrarchidae* (sunfish), and *Cyprinidae* (minnow). *See other sections of this guidebook for additional warm water species.*
7	Examples of molluscan shellfish are oysters, clams, snails, and mussels. Crabs, shrimp, and lobster, are shellfish, but are crustacean shellfish.
8	For a map and explanation of designated wetlands, please contact the NJDA and request a meeting to examine a USGS map or have a GIS search performed.

PERMITTING QUESTIONS

I. Land Use

a. If you plan to disturb more than 5,000 sq. ft of soil for the purpose of pond or building construction, you must contact your local soil conservation district. A list of local soil conservation districts are included as **Attachment A**.

b. Municipalities within the coastal area (CAFRA) are listed in **Attachment B**.

c. Within the CAFRA zone, commercial developments with 50 or more parking spaces, and all industrial and public developments are subject to permit review.

II. Waterfront Development

a. A Waterfront Development Permit is needed for projects involving the development of waterfront near or upon any tidal or navigable waterway. Waterfront development means, but is not limited to, docks, wharfs, piers, bulkheads, bridges, pipelines, cables, pilings, filling, dredging or removing of sand or other materials from lands under all tidal waters, and limited upland construction within 500 feet of tide flowed waters.

III. Wetlands

a. A Coastal Wetlands Permit is needed to excavate, dredge, fill or erect structures on coastal wetlands as delineated in maps promulgated by the NJDEP pursuant to the Wetlands Act of 1970.

b. The Freshwater Wetlands Protection Act seeks to protect freshwater wetlands. State open waters (waters of the United States which are not wetlands) and upland areas up to 150 feet from wetlands serve as buffers from random, unnecessary or undesirable alteration or disturbance. For more information, please contact the NJDA to find out if you will conduct activity within 150 feet of a freshwater wetland.

c. If any part of your project is on a wetland that is currently being used for agriculture, it can be converted to another agricultural use (including aquaculture) without regulatory action.

IV. Stream Encroachment

a. Any construction, installation, or alteration of any structure or permanent fill along, in, or across the stream channel is considered alteration of a stream.

b. The 100 year flood plain can be found on both the Federal Insurance Flood Map and the State Flood Plain Map. These maps are available either through your local township or by calling the New Jersey Department of Agriculture in Trenton. Please see **Attachment H** for contact information.

V. Water Quality Certificate

a. All projects requiring a Federal permit for the discharge of dredged or fill material into State waters and/or their adjacent wetlands also require the State Water Quality Certification ensuring consistency with State water quality standards.

VI. Tidelands Instruments

a. Tidelands, also known as riparian lands, are all those lands that now, or formerly, flowed by the natural mean high water of a natural waterway.

VII. Pinelands

a. Pinelands Municipalities are listed in **Attachment C** as Pineland Area Jurisdiction Boundaries.

b. In the Pinelands Area, a Freshwater Wetlands Permit is needed for the discharge of dredge or fill material in wetlands only.

c. Self explanatory.

VIII. Stormwater Drainage Areas

a. The Hackensack/Meadowlands Drainage Review Area is listed in **Attachment D**

b. D&R Canal Drainage Review Areas/Municipalities are listed in **Attachment E**

IX. Water Supply [Agricultural Water Certification & Registration]

a. Self explanatory.

b. In other words, will you use over 3 million gallons of FRESHWATER in ***any*** month during the year?

X. Well Drilling

a. Wells might be used for any of the following purposes, including but not limited to: dewatering, geothermal, heat pump, injection, irrigation, livestock, water supply, and public non-community water system.

If "yes", a licensed well driller must apply for a well drilling permit.

A New Jersey licensed well driller of the proper class and permit to drill is only required for modification to the physical construction of the well itself (i.e. well deepening or a new screen.) While a permit is not required for the sealing of any abandoned well, a NJ licensed well driller who is certified to seal wells is the only individual who can perform such work.

XI. Water Quality

Cold water aquatic animals are those including, but not limited to the Salmonidae family (for example Trout, Salmon, Char).

a. The amount of feed that your fish will consume each month can be calculated based on your targeted yearly production and feed conversion ratio (FCR). *Your FCR is calculated by the kilograms of feed needed to produce 1kg of product. The lower the FCR, the more efficient the culture species is in converting feed to flesh. For example, a 2:1 FCR means that it takes 2kg of feed to produce 1kg of fish*. FCRs are affected by many variables including type of feed, type/size of species, culture system, and water quality. The amount of feed you are giving to your stock is dependent upon what stage of life they are in. Fry and fingerlings are given a higher percentage of their body weight *(Bwt.*) in feed (4-8% per day) than larger fish are (2-4% per day).

To calculate the total amount of food your fish will consume during a month, take the total weight (in kg) and multiply this number by the percent body weight that you are feeding. The resulting number can be multiplied by the number of days in the month. For example, a farm has a calculated total fish weight of 10,000 lbs. If all fish were being fed 3% of their body weight per day, the calculation would be as follows:

Total Fish weight (lbs) x *%Bwt of feeding* x *30 days/month= 10,000 X 0.03 X 30 = 9,000 pounds of feed per month.*

NOTE*: If different %Bwt. Feeding is used for different size fish, then each size and %Bwt. Feeding needs to be calculated separately and then totaled.*

b. Warm water aquatic animals are those including, but not limited to the families Ameiuridae (Catfish), Centrarchidae (Sunfish), and Cyprinidae (Minnow).

c. Surface water bodies include rivers, streams, lakes, ponds, or mosquito ditches (or storm sewers, wetlands areas, or any other conveyance which ultimately enters one of these entities).

d. Will you send your sanitary wastewater to the same water as your agricultural water? For permitting purposes, it will make it much easier if your sanitary water does NOT go to the same water body as your agricultural water.

e. Self Explanatory.

f. For a listing of POTWs please see **Attachment F**

g. For a listing of POTWs please see **Attachment F**

XII. Pesticide Control

a. Self explanatory.

XIII. Site Remediation

a. If “yes” please provide the information requested in the Application.

XIV. Natural Resources

a. Self explanatory.

b. A list of threatened and endangered species is given in **Attachment L.**

c. The following fish have special regulations in New Jersey in terms of either culturing, stocking, capturing, or selling:

Largemouth bass *(Micropterus salmoides)*: *Except for propagation and stocking for fee fishing, it is illegal to purchase, sell, or possess for sale, any largemouth bass in New Jersey for food purposes. It is also illegal to import them into the state or export them from the state for commercial (food) purposes unless it is for propagation (stocking).*

Smallmouth Bass *(Micropterus dolomieui)*: *Regulations for smallmouth bass are identical to the regulations for largemouth bass listed above*.

Eels *(Anguilla rostrata)* **:** *It is illegal to collect juvenile american eels (also known as glass eels or elvers) from New Jersey waters. You may not be in possession of any eels that are less than 6 inches in length.*

Grass Carp *(Ctenopharyngodon idella)*: *Also known as the white amur, this vegetarian has special import/stocking regulations. For more information on a grass carp stocking application, contact NJDEP Division of Fish & Wildlife. Their number is listed in* ***Attachment H****.*

Goldfish *(Cyprinus carpio)****:*** *It is illegal to stock any type of goldfish in open New Jersey waters*.

Black Sea Bass, Striped Bass, Summer Flounder
The State of New Jersey regulates the possession of finfish and shellfish via various fish and game laws and regulations. Of specific concern to an aquaculturist are the possession, transportation, and sale of certain protected species such as striped bass, summer flounder, and black sea bass. Problems with aquaculturing these fish are:
1) possessing fish under the legal size, 2) possessing fish over the legal creel limit, and 3)harvesting/selling fish off-season. Maintaining accurate written records can circumvent many of these problems. To determine what type of records are required, contact NJDEP Bureau of Marine Fisheries is listed in ***Attachment H.***

Black Sea Bass *(Centropristis striatus)*: *The legal size limit on this fish is 10 inches. There is no possession limit on black sea bass*

Striped Bass *(Morone saxatilis) : The minimum size for striped bass is 28 inches and there is a possession limit of 2 fish.*

Summer Flounder (*Paralichthys dentatus): The minimum size for summer flounder is 15.5 inches and there is a possession limit of 8 fish.*

d. To find a listing of State or Federal Endangered Species, please see **Attachment L**

e. Scientific collecting permits are used primarily for research projects. They often involve fish trapping methods such as electrofishing or gillnetting that would otherwise be illegal for the taking of fish. Aquaculturists who wish to spawn their own fish often collect fish in their natural habitat and bring them back to their facility

to spawn them. They will often do this every year until they can get a domesticated stock of broodfish. If your broodfish are of legal size, the creel limit is not exceeded, and you use a legal method of harvest (such as rod and reel), you will not need a scientific collecting permit. For example, if you are collecting yellow perch broodstock, there is no size limit. You may take 25 (creel limit) yellow perch of any size (by rod and reel using a valid New Jersey Fishing License) and this does not require a permit. But if you are collecting a fish with a size limit and there is a *possibility of the mature broodfish being smaller than the size limit, it* ***is highly advised*** *that you have a collecting permit.* Even though collecting stock for commercial purposes is NOT a scientific activity, a scientific collecting permit is the only permit of this type that is currently available.

f. Import means to transport, receive or possess aquatic organisms from outside of the jurisdiction of New Jersey for the purposes of aquaculture and intentionally place said organism in Waters of the State or into any aquacultural system. If you have a closed system or pond facility with no inlet from or outlet to natural waters, the NJDA will issue your Import permit. If the permit is for use in natural fresh waters, marine waters, or for flow through or pond systems with discharge into natural fresh or marine waters, the DEP will be the permitting agency. A stocking permit issued by the Division on Fish and Wildlife would be required for the release of fish into the "waters of the State". This would apply to fish transported from any waters **within** or outside the jurisdiction of New Jersey that are ***NOT*** going into aquaculture systems.

g. Leased bottom of intertidal or subtidal areas are primarily for shellfish culture. This subject is covered in detail in Section 3 of the Application

h. Self explanatory.

XV. Dam Safety

a. Self explanatory.

XVI. Additional Questions

a. Self explanatory.

b. Federal permits are usually required for operations that involve open ocean culture or are in areas of jurisdiction by the US Coast Guard and/or The Army Corps of Engineers.

c. Self explanatory.

d. Self explanatory.

e. Most marine projects will occur in navigable waters. To determine if your project is in navigable waters, please contact the Army Corps of Engineers at the telephone numbers listed in **Attachment H.**

ACKNOWLEDGEMENT *(page 9): By signing the acknowledgement, you agree that this application will serve primarily as a form to identify which permits, if any, you may need to get from regulatory agencies such as the NJDEP. The acknowledgement asks that you cooperate with the NJDA in the development of production information to ensure the wellbeing of the New Jersey aquaculture industry. This production information will contain details such as species grown and amount harvested.* ***The NJDA will not request any personal or financial information****. The information will be used for record keeping/crop reporting and may be useful to you if your operation is ever in need of disaster relief funding. All information collected will be aggregated and* ***no data will be made public in a form that would reveal information relative to an individual operation****. Your signature also assures the NJDA that you will notify the office at least30 days prior to your changing of culturing activities (such as adding a new species to your product line, or adding a new type of system to your current culture methods).*

USGS MAP (*page 9):* Below the acknowledgement, you are asked to include a USGS site map or appropriate portions thereof and quadrangle reference with the application. This is to help any regulating agency locate your project. USGS maps may be acquired from your County Agricultural Agent or County Soil Conservation District. The NJDA or Aquaculture Technology Transfer Center (ATTC) at Cumberland County College will help you obtain the maps you will need. Please provide 1 sheet only with the appropriate portion showing your site. If you have access to the internet, there are two websites listed in **Attachment H** that can help you identify the name of the particular USGS map that you will need. For a list of private map dealers in New Jersey, please see the listing in **Attachment G**.

PART II: AGRICULTURAL POLICY IN NEW JERSEY

STATE AND LOCAL APPROVAL PROCESS OUTLINE FOR AGRICULTURE/AQUACULTURE PROJECTS

In any project development there always two areas of regulatory review that must be completed: State and Local. The State's regulatory oversight is almost invariably within the Department of Environmental Protection (NJDEP). However, it can also include the Department of Transportation (NJDOT), Department of Community Affairs (NJDCA) and/or the Department of Health.

STATE REGULATORY APPROVAL

In the case of aquaculture, the New Jersey Department of Environmental Protection (NJDEP) will have the most regulatory impact on the project. The NJDEP will review the project for any discharges to surface or groundwater; construction near wetlands or the shoreline; the diversion of surface water or the pumping of groundwater (salt or fresh); the use and storage of pesticides or other chemicals; sanitary wastewater treatment and disposal; and many other environmental issues.

In order to facilitate the identification of potential permits or reviews the New Jersey Department of Agriculture (NJDA) has created an "Application for Aquatic Farmer License". This form is designed to gather as much information as possible on the prospective aquaculture project so that the NJDEP and other State regulatory entities can identify any potential permits or reviews that may be required. This application is also designed to identify projects that may be impractical in New Jersey based upon the regulatory requirements in the State. The license will serve to protect the aquaculturist as well as establish ownership of the species being raised.

Potential aquaculturists can assist themselves through the regulatory maze by providing as much information as possible during the very early stages of the review process. The first and probably most important information that a potential aquaculture developer can provide is a detailed physical description of the property where the project is being proposed. The following questions should be answered and actions taken in the initial phase of seeking regulatory approval:

1) Prepare a base map of the property.

Prior to any meetings with any State regulatory entity, the minimum information needed is a base map of the proposed site. Ideally, this base map will have base topography, a proposed or final wetlands line and any other unique physical characteristics, including but not limited to streams, lakes, rivers, mountains, valleys ditches, old building locations, and the location of any existing buildings. In addition to the information above, the base map should include specific cross streets and landmarks so that the site can be easily located in the field. As with all site plans or base maps, it should include a small locator map in one of the corners.

2) Does the property have any wetlands present?

To determine the presence of wetlands on the property, the applicant has the option of visiting the NJDA for assistance. If the answer is **"yes"** the wetlands should be delineated per the NJDEP's requirements. The process for determining the location and extent of wetlands on a property is known as a "Letter of Interpretation" (LOI). In this process an applicant supplies the New Jersey Department of Environmental Protection Land Use Regulation Program (NJDEP-LURP) or the New Jersey Pinelands Commission with information that is reviewed for acceptance or modification. Their review of this information leads to a final determination as to the extent and type of wetlands present on your property.

If you do not know whether there are wetlands on your property, you should contact the NJDA and ask for GIS assistance. You also have the option to hire a qualified New Jersey Wetlands Biologist to assess the property for the presence or absence of wetlands. As previously discussed, if you are comfortable with this professional's determination, then you would proceed as outlined in the paragraph above.

3) Where will your operation be located on this site?

At a minimum, you should have a schematic overlay that provides a regulator with the potential location of your operation. This does not have to be extremely detailed but it should bear some reasonable resemblance to the proposed project.

4) Provide a written description of the processes to be completed on this site.

This piece of information is almost as critical in the early stages of the process as the base map and wetlands information. Given the right type of information about your aquaculture project the State regulatory entities may be able to determine that certain programs will require no permit or review.

An example of this might occur if you have chosen a "Closed Loop System" that does not require any type of regular discharge to surface water, groundwater or a sewage treatment facility. In fact, when the system is shut down to be cleaned or repaired it is simply drained into a truck or allowed to empty into a drain connected to a sewage treatment system. This kind of information is critical in determining if you will be required to apply for a New Jersey Pollution Discharge Elimination System Permit (NJPDES). The elimination of this requirement could be a pivotal point in the viability of your operation.

Another critical piece of descriptive information is the type of aquaculture operation that will be located at the site, whether finfish, shellfish or plants. Again, this information could assist in the determination as to whether or not a NJPDES permit will be required. It is also important to explain the anticipated volume of fish that will be present in this operation. If your operation is under a certain threshold amount for warm water and cold water species, you may not be required to apply for a NJPDES permit.

POTENTIAL PERMITS AND REVIEWS THAT MAY BE REQUIRED

There are many different aquaculture permits and required reviews in New Jersey as compared to other States. Potential aquaculturists should be aware that competition for usable space along the water's edge is intense in New Jersey. It is for this reason that many of the permits may prove to be too costly or too time consuming for certain types of aquaculture. The following is a list of permits and reviews that might be required for your project. Included in each listing are some general points of information that an aquaculturist should consider before choosing their project's location and the type of aquaculture that they may want to pursue.

FACTS ON AGRICULTURAL WATER CERTIFICATION AND REGISTRATION PROCESS

1. **Authority:**

Water Supply Management Law (NJSA 58:1A) and Ag Water Certification Rules (NJAC 7:20A)

2. **Who Needs Certification?**

Any agriculture, horticulture, or aquaculture operation planning on using an average of 100,000 gallons of water per day for a month (i.e. a minimum of 3 million gallons a month) requires a certification.

3. **When Does a Farmer Need to Secure a Registration?**

If a farmer has the pumping capacity for 70 gallons a minute or more but does not use 3 million gallons of water or more in any month then he/she is required to secure a Registration from the NJDEP through the County Agent.

4. **Where Do I Go For a Certification or Registration?**

The County Agricultural Agent at the Rutgers Cooperative Extension office provides all necessary forms and information and issues all new certificates. Renewal forms and information are also provided by the County Agent but the NJDEP office of Water Allocation issues all renewals.

5. **How Much Does it Cost to Secure A Certification or Registration?**

Ag Water Certification or Registration does not involve any fees for application processing. However, there may be costs involved in the public notice of application.

6. **How Long is A Certification or Registration Valid?**

Certification is valid for 5 years. A renewal is required every 5 years even if no change is necessary to the amount of water needed. A certificate may be modified when there is a change in water demand or other circumstances. Registration does not expire if water use remains less than 3 million gallons a month.

7. What Does the Certification Process Involve?

An applicant for agriculture water certification files an application package with the County Agent. The County Agent reviews the application, requests additional information if necessary, and makes a recommendation on the amount of water needed. A copy of the application package with the recommendation is forwarded to the NJDEP. The NJDEP reviews the package and advises the applicant to publish a public notice in the local newspaper. If no adverse comments are received, the NJDEP advises the County Agent to issue the certificate. If adverse comments are received, the application is referred to an Advisory Panel consisting of representatives of the NJDA, NJDEP, and RCE (Rutgers Cooperative Extension) to resolve the issues through an informal hearing of the parties involved. If the Advisory Panel fails to reach a resolution, a formal public hearing is held by a NJDEP Hearing Officer and a decision is made by the DEP based on the outcome of the public hearing. If the applicant is not satisfied with the outcome of the public hearing, he/she may request another public hearing in front of an Administrative Law Judge, whose decision will be final on the application.

8. What Are the Conditions of Certification or Registration?

The certification requires that record of water use is maintained in a book and annual water use is reported in a prescribed form to the NJDEP. These conditions do not apply to registration.

9. What are the Attendant Benefits of the Certification?

The certification includes the right to construct and repair wells, dams, and other related structures. A stream encroachment permit is not required for irrigation headgates and tidegates related to the certified water use.

10. What Happens if a Farmer Uses Water Without a Certification?

One can use less than 3 million gallons of water a month without a certification. Use of water over this limit without a certification is illegal and subject to penalties.

11. Is There Any Penalty for Any Violation of the Rules?

Yes, penalty provisions include monetary fines as high as $5,000 for each day of violation as well as revocation of certification.

A) General Regulatory Guidelines for an Aquaculture Project

POINT SOURCE PERMITTING - NEW JERSEY POLLUTION DISCHARGE ELIMINATION SYSTEM (NJPDES)

The NJPDES requirements discussed within the next two sections focus on: surface water discharges and residuals. These areas were chosen because most aquatic farms do not utilize a groundwater discharge system.

Aquatic farms are considered as **animal feeding operations.** NJPDES regulations exempt hatcheries, fish farms or other facilities that contains, grow or hold aquatic animals in either of the following categories:

Cold water fish species or other cold water aquatic animals in ponds, raceways, or other similar structures which discharge at least 30 days per year, but **not** including, facilities which produce less than 9,090 harvest weight kilograms (approximately 20,000 pounds) of aquatic animals per year; or facilities which feed less than 2,272 kilograms (approximately 5,000 pounds) of food during the calendar month of maximum feeding. (Cold water animals include but are not limited to the Salmonidae family of fish: e.g. trout & salmon).

Warm water fish species or other warm water aquatic animals in ponds, raceways or other similar structures which discharge at least 30 days per year, but not including closed ponds which discharge only during periods of excess runoff, or facilities which produce less than 45,454 harvest weight kilograms (approximately 100,000 pounds) of aquatic animals per year. (Warm water aquatic animals include but are not limited to the Ameiuridae, Centrarchidae and Cyprinidae families of fish; e.g. respectively, catfish, sunfish, minnows).

Shellfish Only Facilities are operations, which do not include the growing or holding of finfish in their operations.

Any warm or cold water aquatic animal production facility, shellfish or aquaculture project may be required to obtain a NJPDES permit if it is determined to have a significant impact on water quality. However, aquatic farms and aquatic animal production facilities that meet the definitions above may be exempt from a NJPDES permit if they satisfy the criteria listed below:

1. The discharge from the facility protects and maintains existing uses of the water body and water quality standards of that water body.

2. No sanitary or industrial wastewater discharge is mixed with the **Shellfish Only or the Finfish Only Facilities** discharge.

3. Maintenance operations do not result in the release of toxic substances at any levels that are toxic to humans or the aquatic biota, or that bioaccumulate in the aquatic biota so as to render them unfit for human consumption.

4. Agricultural Management Practices (AMPs) are used when appropriate to ensure that the discharge does not violate any water quality standards and controls other potential deleterious effects that the discharge could render on the receiving body or its environs.

5. The discharge does not cause or result in significant erosion in the area of the discharge or surrounding stream banks and does not cause or create downstream flooding conditions.

PERMITS FOR WETLANDS, STREAM ENCROACHMENT, & CAFRA

The application of the standards in these regulatory programs will be less generalized and much more site specific. There will be certain specific requirements based upon the site's physical characteristics.

1. Wetlands (not including pre-existing farmed wetlands) .
2. Stream Encroachment Permits

These permits generally deal with the placement of structures within the floodplain, stream bank or stream bed as well as the alteration of the floodplain. Most of these permits will be dealing with the diversion or discharge of surface water due to the structures that will be required. These permits are usually very straight forward and will require the services of an engineer.

ARMY CORPS OF ENGINEERS

The Army Corps of Engineers (ACOE) will have jurisdiction over any project conducting activities in a navigable waterway or involving dredging discharges. The ACOE would require a Section 10 permit for all activities in a navigable waterway. While the Section 404 program has been assumed by the NJDEP, the ACOE can still conduct a joint review. This is why it is extremely important that any potential aquaculturist have the ACOE review their proposal for any potential reviews or permits the Corp may require. While contacting the ACOE, it would also be advisable to contact the U.S. Coast Guard (USCG) and have that agency review your project as well.

In addition, in regards to water intake structures, if the diversion occurs in certain waterways, the intake structure may require an Army Core of Engineers (ACOE) permit. In all cases, the intake structure will have to be reviewed by the Division of Fish and Wildlife to assess its impact on aquatic life in the vicinity.

SOIL CONSERVATION DISTRICT

Any project that will removes more than 5,000 square feet of topsoil must file a soil erosion & sedimentation plan with the local district office for their review and approval. In addition, the State Soil Conservation Committee (SSSC) through the NJDA has jurisdiction over farm pond construction and permitting. Any proposal involving large scale excavation or the creation of ponds for aquaculture purposes should submit their plans to the appropriate county Soil Conservation District Office for their review and approval.

NEW JERSEY PINELANDS COMMISSION

The New Jersey Pinelands Commission (Pinelands) currently recognizes aquaculture as an agricultural activity. This means that an aquaculture facility in the Pinelands would be exempt from application to the Pinelands Commission. The biggest drawback to developing aquaculture in the Pinelands is surface water discharge is prohibited in the Pinelands. This means that any aquaculture project would have to employ a groundwater discharge system. The Commission is also very concerned with proposals that appear to be aquaculture, but instead are merely disguising a new sand mine proposal. It should also be noted that the Pinelands Commission has its own wetlands requirements, but defers to the NJDEP for all discharge permits, reviews and parameters.

Any structure used exclusively for agriculture (aquaculture) is also exempt from application to the Commission based upon Section 7:50-4.1(a)3 of the Pinelands Comprehensive Management Plan.

Any processing of fish, such as packing, canning or cooking, in conjunction with the aquaculture operation is defined as an agricultural products processing facility by the Pinelands Comprehensive Management Plan. An agricultural product processing facility requires application to the commission.

Contact information for The Pinelands Commission is given in **Attachment H.**

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES

The Food and Milk Program within the Department is responsible for the regulatory enforcement of the State's food, drug, and cosmetic laws, reducing the incidence of food borne illness, promoting consumer food safety, and providing technical support to the food industry and local health and federal and other State agencies regarding food safety.

A firm that sells its aquacultured seafood on a wholesale level (not directly to the consumer) or who processes their marketable products for consumption and sells them on a wholesale basis is required under applicable statutory provisions of Title 24 to apply for and possess a Wholesale Food License. The firm must also meet the sanitary requirements under 8:21-13.

In addition, if the firm sells or processes aquaculture molluscan shellfish on a wholesale basis, the firm must also file for and possess a shellfish certification and meet the sanitary requirements as specified under 8:13 Subchapter 1.

Contact information for the Department of Health and Senior Services is given in **Attachment H.**

THE LOCAL REVIEW PROCESS:

The local review process may involve the planning board, the zoning board or both. This depends solely on the type of proposal that you submit to the municipality. A new construction project on a vacant undeveloped site will always involve the local planning board. A project utilizing an existing site with some rehabilitation of existing buildings and some new construction may require an appearance before both the zoning board and the planning board. This is typical when there is a need for variances from the zoning code. Additionally, you will need to secure necessary approvals from the local construction code officials, fire officials, and other local offices as required by municipal codes.

Scenario A: Rehabilitation of an existing building:

An aquaculture facility is proposed to be developed on an existing farm within an existing out-building that will be rehabilitated with no additional square footage being added.

Potential Local Requirements:
The scenario described above is probably the least complicated way to develop an aquaculture facility. The proposal is to simply rehabilitate an existing building, which in most municipalities will only require a building permit and the required inspections by the code enforcement officers (plumbing, electrical etc.) in the municipality. In some municipalities a building permit review may also require a review by the zoning officer to determine that the proposed use of the building is consistent with the zoning for the site.

Scenario B: New Construction of a facility on a vacant parcel:

An aquaculture facility is proposed to be developed on a vacant parcel requiring extensions of sewer and water. No subdivision will be required.

Potential Local Requirements:
The scenario described above will require a planning board review. If there are any problems in meeting local requirements (such as setbacks, parking, etc.), the zoning board may also have to review the project. Once under construction, the code enforcement officers (plumbing, electrical, etc,) will conduct their inspections as appropriate, and the building inspector will inspect the facility upon completion before issuing a certificate of occupancy.

Scenario C: Substantial Gut Rehabilitation with a small addition.

An aquaculture facility is proposed to be developed on a parcel with a large warehouse structure in need of gut rehabilitation. The project requires a small addition be added to the building.

Potential Local Requirements:
The scenario described above will probably require reviews by both the planning board (given the addition and change of use) and the zoning board, since it is very probable that the proposed project will not require the current zoning requirements.

B) Other Agricultural Policies of Concern to Aquaculturists:

RIGHT TO FARM

The Right To Farm Act provides commercial farm owners or operators with certain protection from restrictive municipal ordinances and public and private nuisance actions. The Act provides the following benefits to eligible commercial farmers:

- Agricultural activities including, but not limited to, production, processing, and packaging of agricultural products, farm markets, sales, agriculture-related educational and farm-based recreational activities are protected.

- To prevent unnecessary state regulation of commercial farms, every state department or agency which proposes a regulation must prepare an agricultural impact statement detailing the proposed regulation's impact on New Jersey's agriculture industry.

- Commercial farms are protected from unduly restrictive municipal regulations and public and private nuisance lawsuits.

- A conflict resolution process has been established to improve communication between farmers, municipalities, and private citizens and reduce litigation time and expense incurred by the agriculture community.

- In order to receive these significant protections, however, commercial farms must be operated in compliance with federal and state laws, agricultural management practices recommended by the State Agricultural Development Committee (SADC) or site specific agricultural management practices;

    - must not be a direct threat to public health and safety; and
    - must be located in an area where agriculture was a permitted use under municipal zoning ordinances; or
    - must have been operating as of December 31, 1997.

For more information, please see contact numbers in **Attachment H.**

FARMLAND ASSESSMENT

Eligibility of land for valuation, assessment, and taxation under the Act shall be determined each year separately. A farmland assessment application Form FA-1 shall be submitted by the owner to the assessor of the taxing district in which the land is situated on or before August 1 of the year immediately preceding the tax year for which such valuation, assessment, and taxation are sought. The owner must represent that the land will continue in agricultural or horticultural use to the end of the tax year for which application is made. It is the responsibility of the municipal assessor to establish the eligibility status of the land for the purpose of approving or denying the application.

Five acres actively devoted to agricultural or horticultural production is the minimum area needed to qualify. Land under and used with the farm house is ineligible and does not count towards the five acres.

Land is actively devoted when:

1. The amount of the gross sales of agricultural or horticultural products produced thereon, any payments received under a soil conservation program, fees received for breeding, raising, or grazing any livestock, income imputed to land used for grazing in the amount determined by the State Farmland Evaluation Advisory Committee, and fees received for boarding, rehabilitating or training any livestock where the land under the boarding, rehabilitating or training facilities is contiguous to land which otherwise qualities for farmland assessment, have averaged at least $500 per year on any additional acres of farmland other than woodland and wetland, and $0.50 per acre per year on any additional acres constituting woodland and wetland during the two-year period immediately preceding the tax year in issue; or

2. There is clear evidence of anticipated yearly gross sales, payments and feed amounting to at least $500 per year on the first five acres, $5.00 per acre per year on any additional acres of farmland other than woodland and wetland and $0.50 per acre per year on any additional acres constituting woodland and wetland within a reasonable period of time.

For information on Farmland Assessment or to obtain an application, please contact the NJDA at the phone number given in **Attachment H.**

SALES TAX EXEMPTION

In an effort to further support the production of food in New Jersey, there is a farm use tax exemption. NJSA 54:32B-8.16 allows an exemption from sales tax on purchase of tangible personal property (**except automobiles and property incorporated into a building or structure other than a silo, greenhouse, grain bin or manure handling equipment**), which is used directly, and primarily in producing agricultural and horticultural products for sale on farms. Aquaculture production falls under this exemption. An aquaculture operation need not be land-based to qualify for this exemption. The exemption can apply to purchases of boats, cages, nets, electronic monitoring and surveillance equipment, feed, fingerlings, seed, rope, and other tangible personal property used directly and primarily in the production of aquaculture products.

FARM BUILDING CODE

The Farm Building Code (NJAC5:23-3.2) was adopted to clarify the Uniform Construction Code's (UCC) interpretation and application to farm buildings. The Farm Building Code makes construction less burdensome to the farm community.

A commercial farm building is defined as any building located on a commercial farm, which produces not less than $2500 worth of agricultural products annually. The main use of the building must be intended for the production of agricultural products.

All designs for new construction, alteration, or repair, must be prepared in triplicate and the sketch plan of the site may be submitted to the construction official. Ordinary repairs do not require a building permit, however, minor work does require a building permit. All plumbing and electrical plans must include the license number of a New Jersey licensed master plumber or electrician.

Packing houses located on a farm are considered commercial farm buildings. Activities, which take place in the building, can include washing, cleaning, hydro-cooling, vacuum cooling, grading, sizing, and packing of the agricultural or horticultural commodities produced on the farm. Farm markets and farm houses are **NOT** *considered farm buildings and must conform to the appropriate building provisions.*

The Farm Building Code also provides a permit exemption for temporary greenhouses which meet the following criteria:

- Not wider than 31 feet
- Plastic covering shall not exceed 6mils
- Plastic covering meets the National Fire Protection Association (NFPA) 701 flame spread ratings
- Used exclusively for the production or storage of live plants **(*This excludes finfish and shellfish production or storage)***
- No permanent anchor devices

FARM MARKETS

Farm market legislation was developed to allow farmers to sell their goods directly in non-commercial area. To qualify, 51% of the sales must be from product raised on the site and agriculture must be a permitted use in the zoning regulations. Whether or not a farm market can operate is also dependent upon the road on which it is situated.

Retail food markets (farm markets are considered retail markets) must also be inspected by the local county health department and are subject to the Division of Weights and Measures inspection of scales.

TRESPASS AND VANDALISM

Trespass is the unauthorized entry upon someone else's property, be it land or water, whether or not the entry is intentional.

Vandalism is the willful or reckless destruction or defacement of equipment, trees, plants or property.

FRESHWATER WETLANDS (NJAC 7:7A)

If a site is in active agricultural production, construction of ponds for aquaculture is simply a continuation of the agricultural use and as such, is exempt from the requirement of a freshwater wetlands permit. To qualify for this exemption, the site should be under farmland assessment and construction should follow appropriate agriculture management practices. All fill should go into upland areas, not into undisturbed wetlands.

ARTIFICIAL WETLANDS (Freshwater & Saltwater)

Wetlands are defined by hydrology, soil, and vegetation. If an artificial freshwater wetland is created as a result of an aquaculture operation, which is sited in an upland area, that area does not fall under the regulations that normally apply to freshwater wetlands.

The New Jersey Aquaculture Development Act (Title 4, Chapter 27) includes a provision (Section 12), "Notwithstanding any law, rule, or regulation to the contrary, an aquaculture site, for which all appropriate permits required by law have been obtained, that was not originally a freshwater wetland as defined pursuant thereto, prior to being utilized for aquaculture shall not be designated a freshwater wetland because of the subsequent growth of aquatic organisms at the aquaculture site."

PART III: AQUACULTURE IN NEW JERSEY

CLIMATE

Because New Jersey has a diverse physiography with portions of the state laying within the broad Atlantic Coastal Plain and other portions lying within the Piedmont, the state has two broad climate zones. In a World Climate Classification the northern portion of the state (that area lying roughly on a diagonal from Camden and Trenton to New York City) is described as temperate with cold snowy winters and long warm humid summers, but it lies at the extreme southern edge of this zone. The southern portion of the state also belongs within the temperate zone but lies in the northern portion of the area, and generally has mild and rainy winters and warm humid summers. This dichotomy is clearly depicted in the average freeze dates ***(Table 1).*** Its southern location and the proximity of Cape May County to the ocean and Delaware Bay accounts for an average of 80 additional days between the first and last freeze dates than in Sussex in the northwestern part of New Jersey.

Table 1: Average freeze dates at selected stations

County	**Station**	**Years of Record**	**Average date of last occurrence of 32°F (Spring)**	**Average date of first occurrence of 32 °F (Fall)**	**Average number of days between 32° F dates**
Atlantic	Hammonton	30	Apr. 16	Oct. 21	188
Burlington	Pemberton	30	May 1	Oct. 11	162
Cape May	Cape May	30	Mar. 30	Nov. 10	225
Cumberland	Millville	30	Apr. 16	Oct. 25	191
Gloucester	Glassboro	30	Apr. 13	Oct. 25	194
Hunterdon	Flemington	30	May 7	Oct. 8	153
Mercer	Hightstown	30	Apr. 23	Oct. 16	175
Middlesex	New Brunswick	30	Apr. 16	Oct. 22	189
Monmouth	Freehold	30	Apr. 20	Oct. 19	181
Morris	Boonton	30	Apr. 24	Oct. 14	172
Sussex	Sussex	30	May 9	Oct. 2	145
Warren	Belvidere	30	Apr. 30	Oct. 14	166

Most upland aquaculture relies on freshwater supplies and must conserve water. The annual precipitation ***(Figs. 1 & 2)*** and evaporation ***(Fig. 3)*** data provide a background for potential replacement needs. For instance, the long term growing season precipitation for Cape May, Cumberland and Atlantic counties just matches the expected March to October evaporation. Thus, in dry years aquaculture ventures in these sites would require additional water. On the other hand aquaculture sites in other portions of the state should rarely have a net loss due to evaporation, but should consider how to remove excess water from the ponds. It is important to remember that seepage from the bottom of a pond may be of greater importance than evaporation for water loss, and that collecting water from watershed runoff may yield many times more water volume than is indicated by simple analysis of evaporation and precipitation.

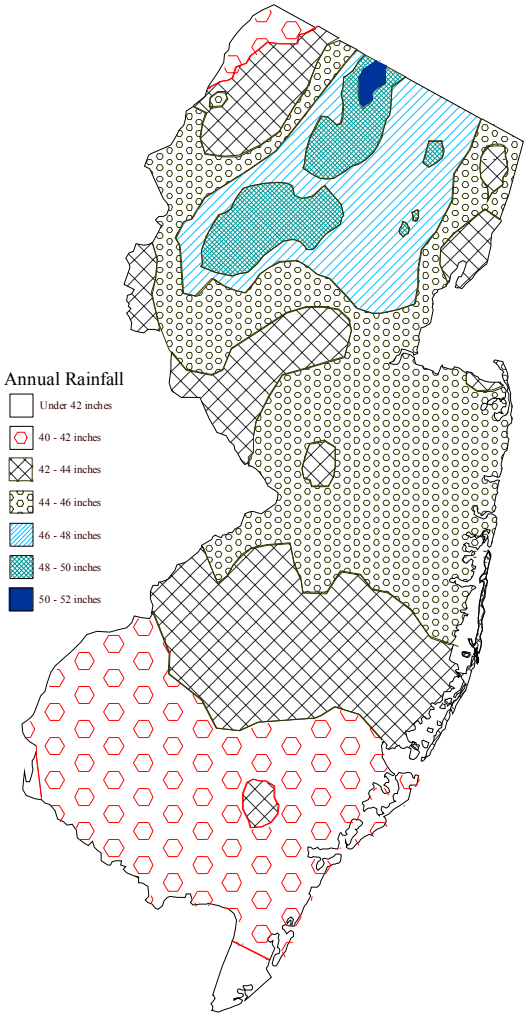

Figure 1: Annual precipitation in inches for the period 1961 to 1990. Data from the NOAA Cooperative and USDA-ZNRSC Sno-Tel networks. Map redrawn from Spatial Climate Analysis Service Oregon State University.

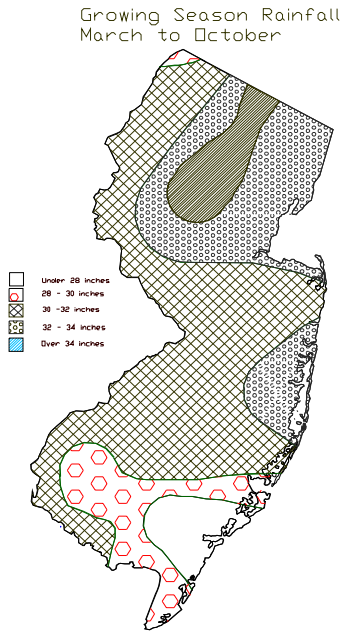

Figure 2: Long term average growing season precipitation in Inches (March-October)

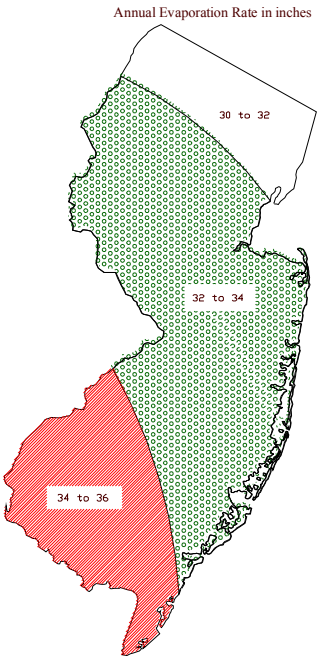

Figure 3: Mean Annual Lake Evaporation in Inches. Redrawn from Weather Bureau Technical Paper N.37.

LAND RESOURCES

The state of New Jersey has a surface area of 7,486 square miles and within those borders are approximately 6,450 miles of rivers, 380 public lakes, reservoirs or ponds comprising 24,000 surface acres. The state has 120 miles of coast line and 420 miles of open waters in estuaries and bays. Freshwater wetland comprises 661,000 acres, and coastal or tidal wetlands encompass another 243,000 acres. There are five major drainage basins within the state and many smaller systems ***(Fig. 4)*** and four physiographic provinces ***(Fig. 5).*** These general characteristics set the broad limits on aquaculture within the state. Microgeographic or microgeological conditions coupled with their associated microclimates may permit different aquaculture production than would be expected from the broad zones depicted in the statewide depiction of the drainage basins or physiographic provinces. Anyone interested in the potential for aquaculture should consult the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) field office to review local conditions. Telephone numbers are listed in **Attachment H.** This is especially true in the Piedmont, Highlands and Ridge and Valley portions of the state.

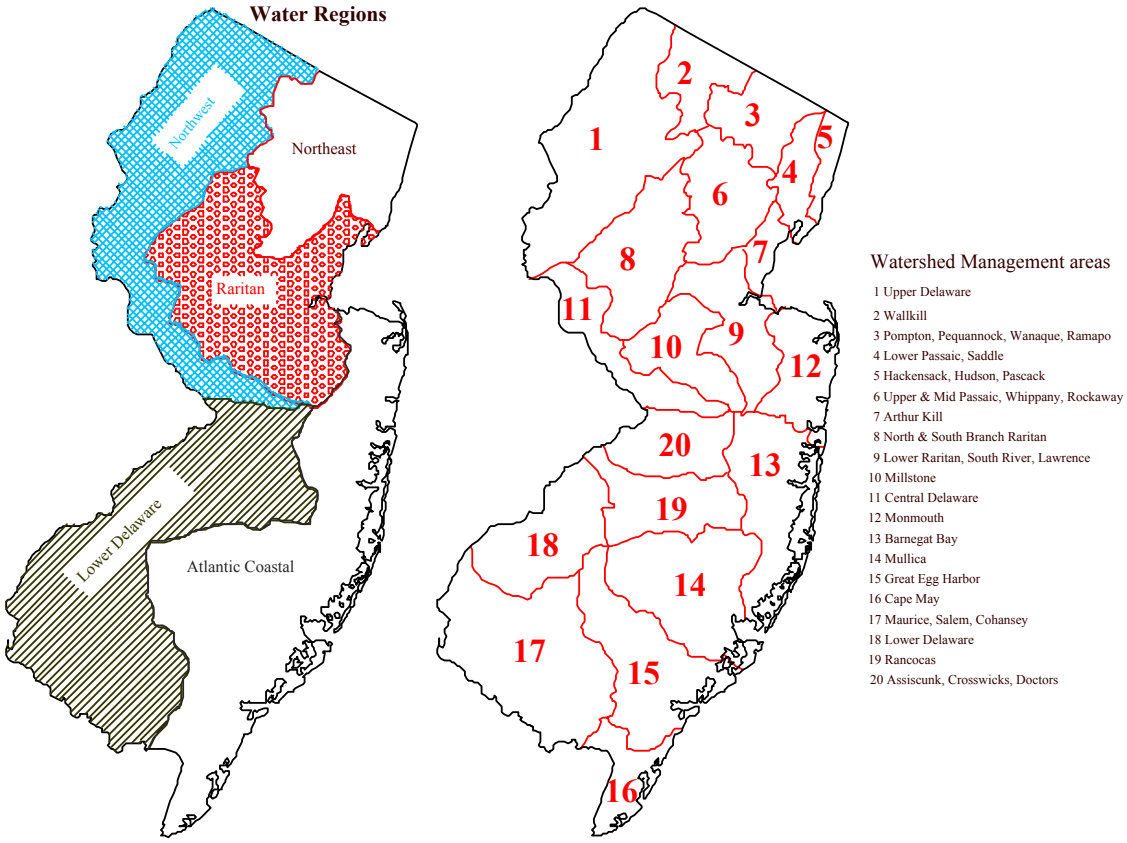

Figure 4: Water regions and Water Management Areas of New Jersey. New Jersey State Redevelopment Plan 2002.

COASTAL PLAIN

Coastal areas include significant areas of marshland. Wetland regulations preclude the use of marshes or swamps in such a way that it would disturb the vegetation. Sitting of intake structures, intake pipes or discharge lines in these areas may be difficult, and will require careful adherence to permitting procedures and applicable rules and regulations, Soils throughout the coastal plain are primarily sand or sand mixed with silt and clay. In areas of Cape May, Cumberland and Atlantic counties these sand deposits are mined. The mining operations leave large areas of water that may be suitable for aquaculture, but the water is often acidic and has low alkalinity and hardness. Utilization of these sites may require agricultural limestone application to increase alkalinity and hardness. Building ponds on most of the coastal plain soils will require careful planning. During the spring the water table is often close to the surface, but the soils have little water retention capacity. There are some areas that have deposits of clay (for example in Salem County) that could be utilized for building ponds, and sand mining companies may be able to supply such materials. It seems likely that most production ponds will have to be built above the water table and will have to be equipped with a liner.

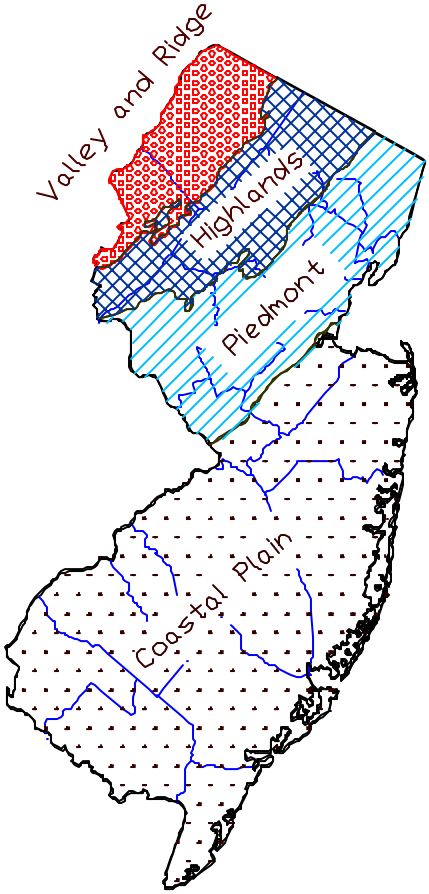

Figure 5: Physiographic Provinces of New Jersey.

PIEDMONT, HIGHLANDS AND VALLEY AND RIDGE

The areas of high slope within these physiographic regions would not be suitable for large-scale aquaculture except some closed systems and areas where intensive trout culture could take advantage of free flowing springs or other natural water sources. Almost all trout waters in the state **(Fig. 6)** are found within this region. The location of the State Fish Hatcheries, the generally cooler climate and the presence of appropriate water make this region highly suited for culture of trout or other cold water species. The Highlands and Valley and Ridge provinces in particular have areas of low population density that is suitable for some freshwater pond aquaculture enterprises. Because rocky material is close to the surface in much of this region, sitting of ponds for fish culture will require detailed local knowledge. The high population density throughout much of the Piedmont region will limit many forms of aquaculture, but the thicker soils may permit development of fee fishing ponds and the proximity to potential markets may make development economically more attractive.

IDENTIFICATION OF PRIORITY SPECIES

A primary focus of the State Aquaculture Plan is to foster commercial scale development of aquaculture in New Jersey. This goal requires a clear focus on those species that are currently being cultured, or could be adapted to New Jersey social, economic and environmental conditions. Only limited discussion is provided below for completely closed culture systems and batch cultures, such as those used by the pharmaceutical or brewing industries. Other specialty systems could be constructed for disease studies and germ plasma isolation. Excluded from species selection is any extensive discussion of those species, which are used primarily for ornamental purposes.

The majority of species listed below have potential for use in New Jersey, and are those species indicated currently being cultured either commercially or by state agencies. A matrix of factors determines which species offer the most immediate potential in New Jersey and the mid-Atlantic.

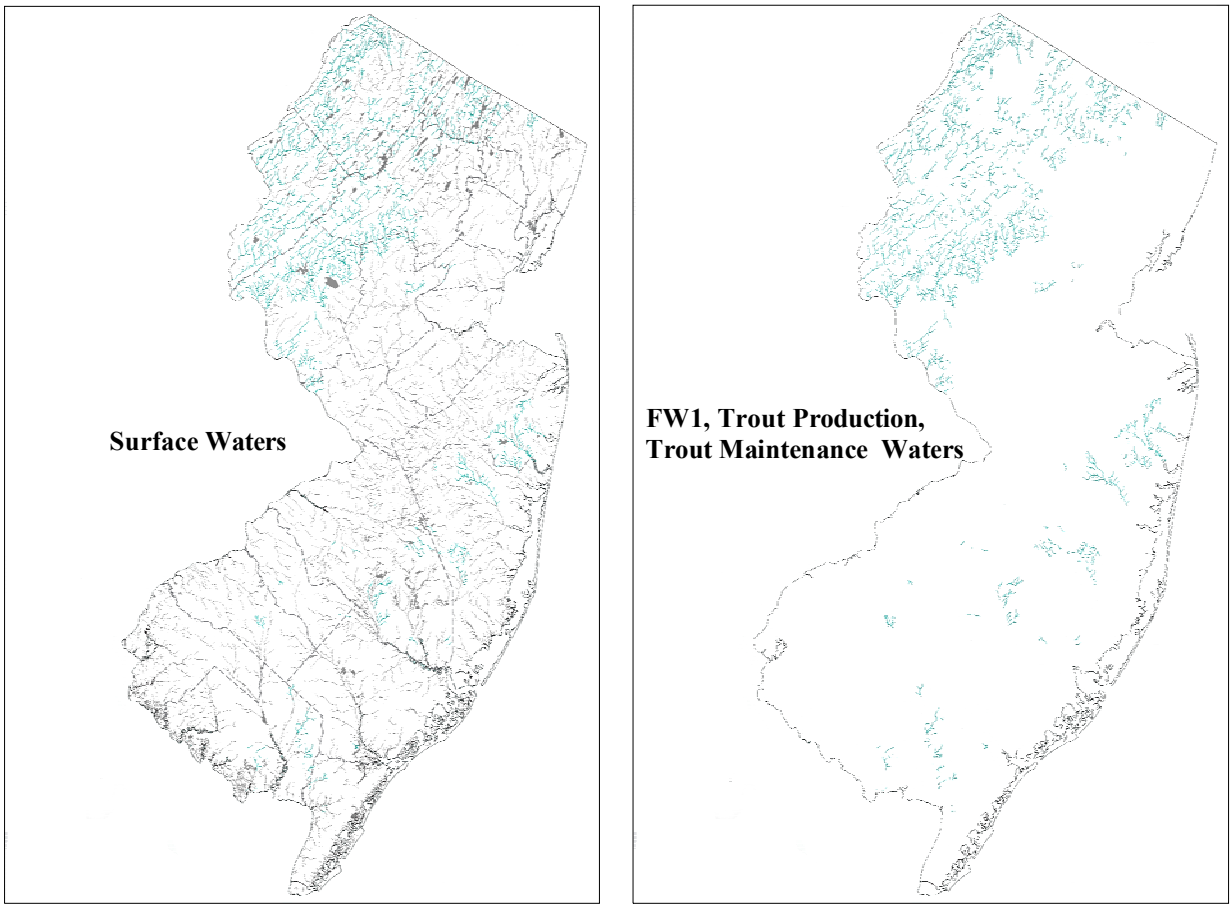

Figure 6: State of New Jersey surface waters and FW1,Trout production and maintenance waters. New Jersey State Development and Redevelopment Plan 2002.

Table 2: Potential species for New Jersey Aquaculture. Bold indicates species currently being cultured in New Jersey.

Fd= Food, Rec= Recreation, Roe=Eggs, Lvr=Livers, Orn= Ornamental, Bt= Bait, Tox=Toxilogical use, Med=Medical use

* Indicates species with size limits and possession quotas for natural populations. (Part 1, Section XIV)

Species	Freshwater	Estuarine	Marine	Use
FINFISH				
Striped bass*	Yes	Yes	Yes	Fd/Rec
Hybrid striped bass	Yes	Yes	Yes	Fd/Rec
Summer flounder*	No	Yes	Yes	Fd
Winter flounder*	No	Yes	Yes	Fd
Atlantic halibut	No	No	Yes	Fd
Atlantic sturgeon*	Yes	Yes	?	Fd/Roe
Cod*	No	No	Yes	Fd
Croaker*	No	Yes	Yes	Fd
Black Sea Bass*	No	No	Yes	Fd
Weakfish*	No	Yes	Yes	Fd
Tuna*	No	No	Yes	Fd
Goosefish*	No	Yes	Yes	Fd/Lvr
Rainbow trout	Yes	Yes (tolerates)	Some	Fd/Rec
Brown trout	Yes	Yes (tolerates)	Some	Fd/Rec
Brook trout	Yes	Yes (tolerates)	No	Fd/Rec
Bluegill	Yes	Yes (tolerates)	No	Fd/Rec
Largemouth bass*	Yes	Yes (tolerates)	No	Fd/Rec
Smallmouth bass*	Yes	No	No	Fd/Rec
Hybrid bream	Yes	No	No	Fd/Rec
Grass carp	Yes	To 5ppt?	No	Fd
Koi carp	Yes	No	No	Rec/Orn
Channel catfish	Yes	Yes (tolerates)	No	Fd/Rec/Orn

Species	Freshwater	Estuarine	Marine	Use
FINFISH				
Black crappie	Yes	No	No	Fd/Rec
White crappie	Yes	No	No	Fd/Rec
American eel*	Yes	Yes	Yes	Bt/Fd
Goldfish	Yes	No	No	Orn
Killifish	Yes	Yes	Yes	Bt
Muskellunge	Yes	No	No	Rec
Northern Pike	Yes	No	No	Rec
Atlantic salmon	Yes	Yes	Yes	Fd/Rec
Tilapia	Yes	Yes	Yes	Fd/Orn
Tropical Fish	Yes	Yes	Yes	Orn
Baitfish	Yes	Yes	Yes	Bt
Walleye/Sauger	Yes	No	No	Fd/Rec
Yellow perch	Yes	No	No	Fd/Rec
SHELLFISH - Molluscs				
Hard clam	No	Yes (tolerates)	Yes	Fd
Soft clam	No	Yes (tolerates)	Yes	Fd
Surf clam	No	Yes (tolerates)	Yes	Fd
Sea scallop	No	No	Yes	Fd
Bay scallop	No	Yes (tolerates)	Yes	Fd
American oyster	No	Yes (tolerates)	Yes	Fd
Blue mussel	No	Yes (tolerates)	Yes	Fd
SHELLFISH - Arthropods				
American lobster	No	Yes (tolerates)	Yes	Fd
Mysid shrimp	Depends on Species			Tox
Crayfish	Yes	Yes (tolerates)	No	Bt/Fd
Prawns	Yes	Yes (tolerates)	No	Fd
Brine shrimp	Yes	Yes	Yes	Orn/Tox
Rotifers	Yes	Yes	Yes	Orn/Tox
Species	Freshwater	Estuarine	Marine	Use

Species	Freshwater	Estuarine	Marine	Use	
SHELLFISH- Echinoderms					
Sea cucumber (Various species)	No	No	Yes	Fd	
Arbacia punctulata (Atlantic purple urchin)	No	No	Yes	Med	
Strongylocentrotus droebachiensis (Purple sea urchin)	No	No	Yes	Med	
OTHER TAXA					
Microalgae	Depends on species			Med/Tox	
Macroalgae	Depends on species			Fd/Med/Tox	
Higher plants	Depends on species			Orn	

Plants

Culture of plants was considered without regard to species selection, but these taxa are important because:

- Micro and macroalgae are important as food for developing organisms, sources of pharmaceutical compounds and as a means to reduce nutrient loads-in effluents. Almost all are valued over $1.00 per pound (in finished product);
- Microalgal production is an important component of any shellfish hatchery;
- Macroalgal production may provide additional products, but its primary initial use would be for reduction of nutrients from fish pond effluent. Some species are used as human food and some are used in the cosmetic industry;
- Higher plants may offer possibilities for nutrient reduction and sale for habitat restoration, but this is primarily an area for research. Ornamental plants for landscape ponds or use in aquaria may offer opportunities in the more densely populated areas of the state. Aquatic food plants such as watercress could be supplied to metropolitan markets.

Invertebrates

Selection of the primary invertebrate candidates was based mostly on our estimates of marketability, price and status of knowledge of culture techniques.

- The only two invertebrates currently being cultured for human food in New Jersey are the hard clam and american oyster;
- Invertebrate species that may develop into industries are: bay scallop, sea scallop, soft clam, surf clam and crayfish;
- Species cultured to provide for environmental testing or as feed for other organisms are brine shrimp, mysid shrimp, and rotifers.

Fish

Selection of fish species offers the broadest spectrum of potential candidates. These include freshwater, marine and estuarine fish species as well as those suitable for closed systems***.*** ***(Table 2)***

- The most promising fish for immediate development of commercial aquaculture within New Jersey are: Striped bass and its hybrids; trout species, sea bass, and largemouth bass. Baitfish and ornamentals also have good potential in New Jersey.
- Grass carp, tilapia, baitfish and specialty products such as koi and fish for the tropical aquarium trades are already being cultured in the State.
- A number of individuals are interested in the potential for summer flounder, sturgeon and eels, but more research on culture conditions, markets, and changes in regulation are required before these fish will be readily developed by the industry.

OPPORTUNITIES FOR PRIORITY SPECIES

Microalgae

Opportunities to develop microalgal strains for use in the pharmaceutical and nutraceutical industries will depend on isolating or manipulating various strains, which can produce high value compounds. Development of culture facilities that can offer large quantities of various microalgal species as food for other aquaculture species will require significant improvement in efficiency of current techniques. Inability to reduce costs of microalgal foods has caused failures of several businesses designed to produce these materials for use within the aquaculture industry. Culture techniques for many of these species are well documented in books and fact sheets, and basic culture media are commercially available.

Macroalgae

Worldwide the aquaculture production of macroalgae exceeds 3,500,000 metric tons. This production is primarily for food, but there are a number of industries that use macroalgae for specific products (carrageenan, agar, emulsifiers and stabilizers). In addition, there are a number of pharmaceutical/nutraceutical uses, and macroalgae can be used to reduce nutrients in effluents. In Japan, there are large farms growing macroalgae for human food, and farms dedicated to growing algae for human consumption are beginning to develop in the Pacific Northwest and New England. Some species of macroalgae are being cultured as food for other cultured organisms, such as abalone.

Macroalgae that have been used for agar production, such as *Agardhiella tenera* and *Gracilaria verrucosa* are common in the shallow bays behind the New Jersey barrier islands. Others, such as *Chondrus crispus* and *Porphyra* spp., may be able to be grown seasonally. *Ulva latuca* has been used to clean effluents from intensive fish aquatic farms in Israel. Optimizing growing conditions for strains that produce specific compounds may be difficult, but developing strains that serve multiple uses, such as in nutrient removal and feed stock for other processes, may offer benefits to aquaculture producers. Within New Jersey there may be significant opportunities to combine macroalgal production with marine fish or shellfish culture systems. Use of commercially valuable species to reduce nutrients in the effluent from fish culture facilities may offer an alternate product that would offset costs of nutrient reduction. Depending on species, these products could be sold to ethnic markets, pharmaceutical companies, or marketed through groups that are actively using them for lawn fertilizer bases.

Higher Plants

Although not often thought of in terms of aquaculture, a number of higher plants are grown for the aquarium and water garden markets. Commercially grown water lilies and other plant species are used for the landscape of ornamental pools. Ecologically based shoreline protection is becoming more important, and there is a small industry developing to produce these plants. Freshwater plants have been used in a number of locations as biofilters to reduce nutrients in sewage effluents. Certainly, they are not often thought of as aquaculture, but fit within the broad definition. Rice is also important as a double crop for the rearing of crayfish. Water chestnuts have been examined as a potential wetland crop for southeastern farmers, and watercress is grown in a number of southern states. Another emerging food species is the *Salicornia* plant. Within New Jersey, the culture of species for ornamental landscape purposes may offer an alternate source of income for operations already growing other plants for those markets. There may be potential for use of water that is high in nutrients to produce these plants, and thus, utilize a resource (high nutrients) that would otherwise be a disposal liability. The economics of such operations would have to be carefully considered, and little information is currently available. A number of farmers are growing dune grass for coastal stabilization projects, and there is no reason that aquatic plants (estuarine or freshwater) could not be supplied to those groups rehabilitating wetlands.

Invertebrates

Clams, mussels, oysters and scallops are traditional aquaculture products. Species being cultured for human food in New Jersey are the hard clam *(Mercenaria mercenaria)* and the American oyster *(Crassostrea virginica).*While most of the mollusks produced are used for food,

there are a number of species cultured for other uses. Bivalves are grown for pearls and mother of pearl buttons. Conchs and abalone are grown for food and rehabilitation of a depleted fishery resources. Many molluscs have been used extensively in biomedical research, and there is potential for supplying laboratories with experimental animals. Several sea urchins and sea cucumbers are used as food, but most interest is in culturing for laboratory use.

Traditional aquaculture of arthropods includes shrimp, prawns and crayfish, but several species of mysid shrimp are cultured for biotoxicity laboratory tests. Brine shrimp eggs can be purchased and raised into adults to be sold into the tropical fish market for premium prices. Brine shrimp are used in vast quantities as the primary food for many larval fish and edible shrimp.

- **Hard Clam** *(Mercenaria mercenaria)*

Hard clam aquaculture became established in New Jersey in the middle 1970's and is the most important aquaculture industry within the state. There are several hatcheries producing clam seed and many other growers who rear these seed to market (little neck) size. New marketing efforts will be required to provide increased markets for the large numbers of clams available through aquaculture.

All clam culture is conducted in the shallow lagoonal systems behind the barrier islands, and all successful hatcheries or nurseries have access to consistently high salinity (>26 ppt) water. The coastal area potentially available for clam culture is increasing as more waters are opened to shellfish. Easy to use culture manuals are available, and economic projections for various combinations of culture techniques have been explored. The expertise in molluscan culture is available at Rutgers University Haskin Shellfish Research Laboratory and could make a major contribution to increasing the efficiency of hard clam culture.

Increasing efficiency in hatchery technology, genetics, nursery and field grow-out, and over-wintering of seed will be required for New Jersey culturists to remain competitive with large-scale aquaculture of this species in other states. Since New Jersey is a major market for hard clams, appropriate legislative support, demonstration of techniques and other positive factors could easily increase production by a factor of 2 within a few years, but difficulties obtaining leases, regulatory uncertainty and winter kill of seed clams is currently limiting investment. With appropriate support, hard clam production within New Jersey could easily be increased 10% per year throughout the next decade.

- **Oyster** *(Crassostrea virginica)*

The oyster has traditionally been a high value item produced by New Jersey fishermen ***(Table 3)***. Aquaculture already produces the vast majority of oysters in the Pacific Northwest, and aquacultured oysters in the shell are sold in Baltimore, Washington, Philadelphia and other markets at prices that are 35 to 45% higher than for hard clams. The major impediments to commercial scale aquaculture in the region are the oyster diseases (**MSX**- *Haplosporidium nelsoni* and **Dermo** - *Perkinsus marinus),* lack of eyed larvae for remote setting and lack of demonstrated techniques for large scale field culture. Rutgers University has well developed programs on oyster genetics and oyster diseases. They have developed a strain of oysters that is tolerant of MSX and is working to incorporate Dermo resistance into this strain as well.

Resistant stocks are maintained and research is currently underway to demonstrate the broad applicability of these stocks.

In view of current expertise, availability of existing stocks and the potential for oyster culture in both Delaware Bay and the shallow lagoons along the Atlantic coast the oyster should be considered as a high priority species. Unfortunately, the presence of the oyster disease Dermo currently makes commercial production difficult, however an effort is underway to combat this disease. Publications are available that describe the basic aquaculture of this species.

Other Invertebrates

The other invertebrates that offer potential for aquaculture in New Jersey include bay scallop, sea scallop, soft clam, surf clam, sea cucumber, crayfish and sea urchins. The bay scallop could be a high priority species for rehabilitation or reestablishment of previously existing populations. The surf clam, sea scallop, and bay scallop require consistently high salinity (>27 ppt) to maintain their commercial culture, and thus, they could be considered as potential alternatives to hard clams in the coastal lagoons or the continental shelf. Hatchery and nursery culture of these molluscan species requires the same equipment and general conditions as oysters and hard clams. Field growout may be substantially different for scallops, but the equipment and protection devices would be similar to that of the hard clam. Varying levels of research, market development and economic analyses will be required to justify broad scale aquaculture of these species.

FISH

There is an astonishing array of species and uses for aquacultured fish. Clearly, most people consider the prime use of aquacultured fish to be food. However, large numbers of fish are grown for: aquaria (ornamental), bait, rehabilitation of wild stocks, bioassays, and recreation (fee fishing).

Certain factors will shape the type of culture that will be practiced in our area. New Jersey is located too far north for significant warm water operations. Cold water fish culture will continue by taking advantage of fish for stocking in natural waters and fresh fish markets and restaurants. The larger trout hatcheries in the northwest can produce and ship frozen product into our area at a lower price than can be grown locally. Freshwater fish culturists will have to depend on niche marketing and flexibility. Land cost and water availability are major limiting factors to further development of freshwater fish culture in New Jersey. The greatest potential in fish culture could be in salt water aquaculture. New Jersey has significant access to saltwater and proximity to market. Limited potential exists for cage culture operations in conjunction with irrigation ponds used for traditional agricultural crops.

Current market price information and sales volume are readily available for the estuarine/marine species and trout, but data on commercial aspects of bluegill, largemouth bass, and grass carp are limited. In addition, in many states it is illegal to sell largemouth bass for food. New Jersey regulates sale of largemouth bass and limits those sales to appropriately licensed individuals. An opportunity that should be examined is the use of ponds or tanks as holding facilities for fish grown in the south or mid-west and transported to New Jersey where they can be provided to niche markets. While this is not aquaculture by a strict definition, it does utilize many of the same techniques.

- **Striped Bass and Hybrids**

Based on information on culture conditions, adaptability to a wide variety of conditions and value as a food and sport fish (including fee fishing), striped bass and its hybrids (hereafter called striped bass) are the fish of choice for the majority of southern New Jersey waters. Areas in northern New Jersey may be more suited to trout culture.

There are some challenges for striped bass culture in New Jersey. Striped bass do not perform well in water with poor buffering capacity. Larval striped bass are particularly intolerant to waters with pH levels less than 6.5-7, except when some salt is present. These factors limit the adaptability of striped bass in many of the poorly buffered waters in southern New Jersey. To some extent, poor pH conditions could be remedied by liming enclosed water bodies.

Theoretically, if steady year-round supplies can be sustained by a strong aquaculture industry, marketing strategies could be developed to stabilize the price. There are many hybrid striped bass fingerling producers in the United States. Production of food fish has increased dramatically in recent years in the US from several thousand pounds of striped bass produced in 1985 to several million pounds in 1998.

In a more positive light, little attention has been given to developing fee fishing facilities for striped bass, but in view of this species recreational image, such facilities could provide considerable additional value for New Jersey growers. New Jersey production is limited to a few fledgling operations, but producers have sold most of their production in state for a reported $2.50 to $4.00 per pound.

- **Bluegill/Largemouth Bass**

The major use for traditional bluegill/largemouth bass aquaculture in New Jersey would be for farm ponds that cannot support striped bass. There are many areas of southern New Jersey with acidic water that will be unsuitable for striped bass culture, but if hardness and alkalinity are above 5 ppm, farm ponds are acceptable for culture of bluegills or largemouth bass. Alternatively, hybrid (or triploid) sunfish or largemouth bass may be reared in large tanks or isolated ponds and used to stock areas that are unsuitable for young fish or rapid growth. Most likely, economic return from this latter technique would be based on fee fishing. Both of these species have been cultured for decades and expertise is available at the NJDEP hatchery in Hackettstown. Economic projections based on fee fishing are not available. There is a large ethnic market for largemouth bass in Asian markets around the country and in Canada. Under current regulations, sale of largemouth bass for food in New Jersey is not allowed, but fee fishing is permitted.

- **Grass Carp**

Grass carp are currently being grown in New Jersey to satisfy a small ethnic market. They are also highly sought after for weed control in public or private lakes/ponds. The culture conditions required by these fish are well established. Grass carp offer the potential for an additional crop to supplement. Due a limited market, broad scale culture of this species would be useful only when it could be polycultured with more valuable species.

- **Trout**

There is one commercial trout production facility currently operating in New Jersey. While some individuals have experimented with rearing trout in salt water during the winter, most trout culture will be centered in the North or Northwestern portion of the state. Ample manuals and expertise are available to anyone wishing to culture trout. Expertise on large-scale trout culture is available through the Division of Fish Game and Wildlife at the State Hatcheries in Pequest and Hackettstown.

OTHER OPPORTUNITIES FOR AQUACULTURE RELATED INDUSTRIES

Feeds

Feeds are an essential component to most crustacean and fish culture. Feed mills that specialize in fish food are located in Pennsylvania, and a New Jersey company is a large supplier of fish meal for incorporation into fish food diets. Some therapeutic agents are given to fish through the feeds. With the large concentration of pharmaceutical companies in New Jersey, there is potential for increasing interactions between feed producers and these companies. If large-scale fish culture develops in New Jersey, there may be an opportunity to combine a feed mill with utilization of fish processing waste, thereby offering a mechanism for increasing value of commercial landings.

DIAGNOSTIC CENTERS

Fish Diagnostic Centers

The New Jersey Division of Fish and Wildlife will provide limited diagnostic services to the private sector on a time available basis. Top priority will be given to those fish that will be released into the streams and lakes of New Jersey. At this time, the US Fish and Wildlife Service (USFWS) will not provide diagnostic services to the public sector. They suggest that the necessary services can be obtained for a fee from private laboratories. The potential role of the USFWS will be to provide services that are not likely to be obtainable elsewhere.

For the foreseeable future, the NJDEP hatchery at Hackettstown has the capability to handle the volume of work that will be generated by existing fish culture facilities. The contact information for the Hackettstown hatchery is given in **Attachment J.** The services available are limited to bacteriology, parasitology, and histology. Virological services are not available. Due to the nature of virological assays (they require cultivation and maintenance of specific fish cell lines), it is not feasible to go to the expense of setting up this service for a small number of hatcheries. This type of diagnostic service would work best if it was regional in nature.

Presumptive viral diagnosis can be provided on the basis of histology and clinical data. Confirmatory diagnosis would require performing virological assay using tissue culture techniques. This service may be required in some instances. As aquaculture develops within the state, the Agriculture Experiment Station may develop additional diagnostic services.

Shellfish Diagnostic Centers

The only center in New Jersey that currently provides diagnostic services for shellfish is the Haskin Shellfish Research Laboratory of Rutgers University. These services are generally limited to examination of molluscan diseases. Services are available to the general public on a time available basis or for particular problems on a fee basis. Resources are limited and diagnostic services cannot provide bacterial identifications, nor can viral diagnoses be made. Contact information for the Haskin Lab is given in **Attachment J.**

Private Diagnostic Centers

Some private consultants will make diagnoses of certain shellfish diseases, but such services are limited and expensive. Diagnostic centers will probably continue to be services provided by governmental sponsored groups into the foreseeable future. Services associated with water, soil, nutrient or discharge analysis for aquatic farms could be provided by various consulting groups or testing laboratories doing similar work for other reasons. The FDA Center for Veterinary Medicine is currently working with aquaculture groups to support the registration of theraputants through the Investigational New Animal Drug (INAD) process. Veterinarians may work in conjunction with the governmental facilities to assume FDA therapeutant regulations are being met.

USAD/APHIS

The Animal and Plant Health Inspection Service (APHIS) is the primary federal agency responsible for preventing foreign introduction of pests and diseases into the U.S. They are also responsible for controlling and eradicating introduced agricultural pests and diseases as well as preventing wildlife damage to agriculture. The Veterinary Service (VS) of APHIS serves to protect and improve the health, quality, and marketability of U.S. animals and animal products. The VS also diagnoses, prevents, and controls animal diseases, monitoring for new threats and responding to emergencies. The VS also monitors and regulates the laboratories that perform diagnostic tests, such as those mentioned above. For more information, contact USDA/APHIS at the phone number listed in **Attachment H.** VS Services offered to Aquaculturists are as follows:

- Voluntary Certification programs
  - --Health Certifications for export
  - --Laboratory approvals
- Industry Partnerships
  - --Scientific Technical Committee
  - --Production/Marketing Committee
- Training/Personnel Commitment
  - --Regional Training Courses
  - --Specialty Workshops
  - --Hiring Aquaculture Specialists

Pharmaceutical Products

The large concentration of pharmaceutical companies in northern New Jersey offers some potential for the use of aquaculture in the production of high value compounds. Microalgal strains that have high concentrations of specific compounds, such as beta carotene could be manipulated to produce significantly higher yields. Additional high value products could be produced from genetically engineered macroalgae.

Toxicological Testing

EPA standards for monitoring and clean-up of superfund sites, as well as testing of materials, such as dredge spoils, often require organisms for toxicological testing. Most organisms used for these procedures are produced by small companies that maintain specific strains. There are potential opportunities for developing new strains with specific toxicological responses that could be used in effluent testing and other fields.

PART 4: Financial Considerations for Aquaculture: Business Development

Is Aquafarming for You?

Under the right conditions, and with careful preparation, aquaculture can be profitable. For one poorly prepared and informed, aquaculture is unlikely to be a successful venture. Practical experience can be gained by starting with smaller type systems before moving on to larger scale culture.

The following **checklist** (*from the Aquaculture Technology Progra, Cumberland County College*) identifies many issues that prospective culturists should consider. Read each question carefully and answer honestly. As you answer questions you will gain a better understanding of the complexity and requirements of aquaculture, and determine whether aquaculture is appropriate for you. Answering "yes" to most questions does not guarantee success. It does improve the likelihood of a successful aquaculture experience. The next step is to meet personally with a knowledgeable aquaculture specialist to assess your specific situation and explore potential options.

Marketing Considerations

Yes No

☐ ☐ 1. Have you assessed the existing situation and determined where you can compete effectively?
☐ ☐ 2. Have you identified primary and alternate markets?
☐ ☐ 3. Do you know in what form you will market your product (e.g., alive, dressed, fillets)?
☐ ☐ 4. Can you continuously harvest and market your product throughout much or all of the year?
☐ ☐ 5. Do you have the means to harvest, handle, hold, and transport your product?
☐ ☐ 6. If desirable, can you join or form an aquaculture cooperative?
☐ ☐ 7. Are you familiar with legal issues of marketing your product?
☐ ☐ 8. Do you have the resources to construct and operate a Health Department approved facility if fish will be processed ?

Economic Considerations

Yes No

☐ ☐ 1. Have you developed a realistic written business plan with monthly objectives and projected cash flows for the first year and annually for each of the next three to five years.
☐ ☐ 2. Do you own or have access to property needed for the proposed aquaculture operation?
☐ ☐ 3. Have you determined expenses for construction or improvement of the aquaculture site?
☐ ☐ 4. Do you own or have access to most of the necessary equipment (e.g., pumps, nets, tanks, aerators, boats, predator control devices)?
☐ ☐ 5. Can you secure the capital for start-up and operation at a reasonable cost?
☐ ☐ 6. Will your lender accommodate your production/marketing cycle (which differs from traditional row crops)?
☐ ☐ 7. Is the profit potential for aquaculture higher than that of other possible investments?
☐ ☐ 8. Will the expected profit be adequate compensation for your labor and resources?
☐ ☐ 9. Can you afford to wait 6 to 18 or more months for income until your first crop attains marketable size and can be sold?
☐ ☐ 10. Do you have an adequate cash reserve for unanticipated costs (e.g., equipment failure, system modification, losses)?

Socio-legal Considerations

Yes No

☐ ☐ 1. Will your neighbors and other user groups (e.g., recreational, commercial fisheries) accept the aquaculture operation (the operation will not interfere or be perceived to interfere with their interests)?
☐ ☐ 2. Have you identified the permits required to construct and operate an aquaculture operation?
☐ ☐ 3. Can the required permits be obtained without excessive investment of money, time, and effort?
☐ ☐ 4. Can you obtain permits for an extended time and not have to renew them frequently (i.e., could you improve a site and then lose access to it)?

Personal Considerations

Yes No

☐ ☐ 1. Are you willing to work long, hard, and irregular hours (e.g., 16 hours/day, 7 days/week)?
☐ ☐ 2. Do you get along well and communicate effectively with people? (Small producers must do it all to sell their product).
☐ ☐ 3. Are you comfortable with mathematical problem-solving and mechanical trouble-shooting?
☐ ☐ 4. Will you seek help when needed?
☐ ☐ 5. Do you personally have the technical expertise with fish or shellfish to manage the operation?
☐ ☐ 6. Can you afford to hire an experienced technician?
☐ ☐ 7. Do you know others in the business that will provide help or information?
☐ ☐ 8. Does your state have an aquaculture association that you can join?
☐ ☐ 9. Do you receive aquaculture periodicals?
☐ ☐ 10. Are you willing to take a course in aquaculture or "how to" workshops to become informed?

Site and Design Considerations

Yes No

☐ ☐ 1. Is the proposed culture site an unrestricted area (e.g, not a right-of-way or wetland)?
☐ ☐ 2. Is the prospective culture site located near the market and processing facilities?
☐ ☐ 3. Is the proposed site suitable for aquaculture (e.g., there is no history of pesticide use in the area, the topography and soil type are appropriate for economic construction, gas and power lines will not interfere with construction or operation, you have all-weather access to your culture operation)?
☐ ☐ 4. Can the site be made suitable for aquaculture production with an acceptable amount of investment?
☐ ☐ 5. Is the site sufficiently large for expansion if desired in the future?
☐ ☐ 6. Have you explored the advantages and disadvantages of leasing vs. ownership?
☐ ☐ 7. Do you live close enough to the culture site to visit and monitor as needed, and to ensure security?
☐ ☐ 8. Is the system designed and constructed specifically for aquaculture (vs. recreation, aesthetics, etc)?
☐ ☐ 9. Is an adequate supply of high quality water available and suitable for aquaculture production?
☐ ☐ 10. Will water quality and quantity remains suitable for continuous production (e.g., the possibility is low that your shellfish lease will be closed due to water degradation, flooding is not a problem)?
☐ ☐ 11. Can you control water to, from, and within your system (e.g., can you drain and fill ponds when needed, bypass a raceway, or adjust water flow when treatments are needed)?
☐ ☐ 12. Can you effectively manage wastes produced by your operation?
☐ ☐ 13. Can you prevent wild fish, birds and other predators, diseases and parasites from entering or impacting your system?
☐ ☐ 14. Can you treat diseases and parasites that may infect your fish?
☐ ☐ 15. Is an economical and dependable electricity source available?

Production Considerations

Yes No

☐ ☐ 1. Have you determined what species you want to culture, and do you know its biology?
☐ ☐ 2. Have you explored the different production technologies available and identified one that satisfies your interests and resources?
☐ ☐ 3. Do you have the resources (financial, technical, and spatial) needed to maintain and spawn adults, incubate eggs, and rear juveniles?
☐ ☐ 4. Are dependable sources of fingerling finfish or shellfish seed locally available

DEVELOPING A BUSINESS PLAN

As in any business, developing an economically viable aquaculture operation requires careful planning. Often potential pitfalls and problems are not clearly identified prior to inception. Developing a business plan can assist you in identifying potential problems before they arise and help to ensure that your business is viable in both the short and long term. A number of aquaculture operations fail because they are undercapitalized and have not made realistic long term cost projections.

Consider the role that you expect aquaculture to play in your overall income picture. Are you interested in:

Supplementary income or
Replacing your current business

A written business plan will provide:

1. A management tool,
2. An identification of the specific strengths and weaknesses of a concept,
3. Quantify objectives,
4. Identify resources,
5. Plan for future eventualities,
6. Reduce the risk of going into business and
7. Allow you to better introduce and market your business to sources of financial assistance and others who may provide assistance,
8. Raise money for capital ventures or operating expenses,
9. Allow you to make mid-course corrections,
10. Provide an evolving piece of documentation, which will assist you in setting your goals and priorities.

Business plans do not have to be lengthy. They need to be focused and demonstrate direction. Background and additional information can be used in the attachments. Most of the people who read your business plan will not understand your business. Your job is to educate them. While you are developing your business plan, try to anticipate the questions that prospective financial officers and investors will ask.

The three major components of a business plan are:

1. An Executive Summary
2. A Marketing Plan
3. A Financial Analysis

Executive Summary

1) *Description of the industry*-What is aquaculture?

2) *Description of your business*–This section should include location, size, products, general facility and production design. It should include information about projected equipment needs.

3) *Description of the product line and the services that you plan to provide.*

4) *Operation of the Facility*-This section should include an explanation of the production system, equipment requirements, assumptions about the growth of the species, life cycle concerns,

5) *Management*-How will your facility be managed? If you have several employees, clear cut functional duties, responsibilities and lines of communication should be established.

6) *Research and development.* If you are involved with new technologies and have a research component to your operation, this should be described briefly.

7) *Personnel needs*

8) *Development schedule*–This should be on a year by year basis without specific start dates

Marketing Plan

The marketing plan should be developed prior to the financial analysis and based on actual research.

The marketing plan should include:

1. A description of the product (do you plan to sell live fish, fillets?)
2. The proposed market,
3. How you will get your product to that market,
4. How you will position your product in the marketplace to distinguish it from your competition both in terms of quality and service?
5. How will you market your product?

It should include an analysis of significant competitors. Since we are rapidly moving toward a global market, it is important to consider both domestic and international competition. If you are planning to sell live tilapia, it is important to consider the possible impact of imported frozen product entering the marketplace. These become significantly more important if the domestic economy experiences a downturn.

It is important to consider these shifts in the macroeconomy so you can protect against these changes. For example, what will you do if you are selling to one major restaurant chain and suddenly, they determine that they need to cut food costs and change suppliers to purchase frozen fillets from overseas? This doesn't need to be included in the formal business plan but you should consider it in your own futuring process. When developing your marketing plan consider:

Product Assessment:

1. Which species is in most demand in your area?
2. What size fish does the market require?
3. What quality does the market demand?
4. Are there any specific certifications etc. that are required to market this fish?
5. If so, what are the costs of these certifications?
6. How does the market want the product delivered? Live, dressed/filleted/etc prepackaged frozen. If the market requires processed product remember to consider the additional cost of processing and holding product. To minimize expenses, are there any processors in the area who could handle your processing on a contractual basis?
7. What is the average order?
8. Is the demand for the product constant throughout the year? Are there seasonal fluctuations?
9. Why would the buyer prefer to purchase your product?
10. What are your goals for increasing product demand both from existing and new customers?

Market Assessment:

1. How many potential buyers are available in your area?
2. What is the average price that your buyers expect to pay?
3. Do you have a marketing and promotion strategy?
4. What is your competition? Remember to consider product coming from both overseas and distant producers.
5. Do the customers that you have identified require any special certifications or processing?
6. What is the yearly volume of each of your potential customers? In most cases 80% of your business will come from 20% of your customers.

7. How can you provide a better product or service than your competitors?
8. How will you let your buyers know that your product/service is better than your competitors? How strong are your competitors?
9. Are there any future trends that could effect your market, i.e. increased supply, certification requirements? What are the projected costs of those certifications
10. What is the geographic market that you wish to address? How will you move product to buyers?
11. What is the possibility for expanding your market?

Pricing:

1. What is the current price range for your product? (*Remember to consider product form when comparing prices– e.g. the average yield when filleting finfish is 30%).*

2. What condition(s) can result in a reduced market price? (Influx of imports, health scare or warning, increased availability of frozen products)

3. What conditions could result in a price increase? (Reduced supply, positive press about seafood consumption and/or aquaculture production, etc.)

4. How will your customers pay? What is your policy on credit? What payment terms do your competitors use?

5. Can you expect demand and price to remain relatively constant over a five year period?

6. Have you identified more than one buyer for your product?

7. If you are planning to process your product, remember you will have additional inspection, labor, equipment and waste disposal costs.

Financial Analysis

Production costs are generally divided between fixed costs and variable costs. Fixed costs are those costs that must be paid regardless of your level of production. These include overhead, capital costs, interest, and depreciation., Variable costs are dependent upon your level of production. These include payroll, seed, fingerlings, feed, labor, electricity etc.

Financial Plan

Most lending institutions are looking for a financial analysis for a reasonable time horizon usually 3-5 years. A certified accountant should prepare the financial analysis but you will need to make some basic assumption and projections about your proposed business.

1. ***Capital Equipment List*** --All major items should be listed separately. Tractors, tanks. computers, office furnishings, seines, etc. should be provided for the purposes of informing the readers about depreciation, maintenance, and collateralization of assets

2. ***Breakeven Analysis*** --The breakeven point is that level of production that achieves zero profit (revenue less variable and fixed costs is zero).

3. ***Pro Forma Balance Sheet*** --A balance sheet should be provided as of the end of each year or reporting period in the venture's planning horizon. The purposed of the statement is to show the financial position of the venture at various points of time. The assets, liabilities and equity should be detailed as possible with proper notes and assumptions given.

4. ***Pro Forma Income Statement*** --An annualized accrual based income statement should be provided over the length of the planning horizon to show profitability of the venture. Supportive data such as production estimates, learning curves, conversion rates etc. should be listed

5. ***Pro Forma Cash Budget*** --This financial statement is intended to indicate the cash flows of the operations and its ability to meet cash obligations. Each year of the planning horizon should be included in the business plan. The cash budget should also indicate the amount and timing of cash flows to and from investors and financial intermediaries.

6. ***Equity Capitalization--*** This is a summary section to show the prospective lender/investor the total amount and timing requirements of invested capital. The purpose of this section is to show the degree of financial risk being taken by the principal(s). The methods of payback of capital should also be reported.

7. ***Debt Capitalization*** -- This section highlights the extent of involvement by lenders, The types of borrowing, terms, amounts and timing, and the percentage of the total capital should be indicated. An annual ratio of debt to equity should be provided in this section for the planning horizon

Example of a *pro forma* balance sheet

1. Current Assets

A. Fish inventory
B. Cash
C. Supplies
D. Accounts Receivable
Total

2. Noncurrent Assets

A. Equipment
B. Broodstock
C. Wells
D. Ponds/tanks
E. Land
F. Buildings
Total

3. Current Liabilities

A. Accounts Payable
B. Operating Loan
C. Current portion of Mortgage Payable
D. Sales tax
E. Payroll taxes payable
Total

4. Noncurrent Liabilities

A. Equipment Loan
B. Real Estate Loan
Total

5. Total Assets (item 1+ item 2)

6. Total Liabilities (item 3+ item 4)

7. Net Worth (item 5-item 6)

8. Equity/Asset Ratio (item 7÷ item 5)

9. Debt/Asset Ratio (item 6÷item 5)

10. Debt/Equity Ratio (item 6÷item 7)

11. Current Ratio (working capital on current position) (item 1 ÷item 3)

12. Working Capital (item 1- item 3)

13. Debt Structure (item 3÷item 6)

14. Working Capital: Value of Farm production (item 12÷item 1A)

Pro Forma Income Statement

1. Cash Farm Income
   - Fish/shellfish sold*

2. Cash Farm Expenses
   - A. Variable Cash Expenses
     - Feed
     - Fingerlings/seed
     - Fuel
     - Chemicals
     - Labor**
     - Harvesting
     - Hauling
     - Other variable costs
     - Interest on operating capital
     - Maintenance and repair
     - Utilities
     - Taxers (state and federal)
     - Workers Compensation
     - Unemployment Insurance
     - Social Security
     - Etc.
   - B. Fixed cash expenses
     - i. Interest
     - ii. Insurance and taxes
     - iii Rent***/mortgage
   - C. Total Cash Expenses

3. Net farm income (item 1- item 2C)

4. Depreciation

5. Net Farm Income from Operations (item 3-item 4)

*At this stage, you will need to decide on a pricing structure for your product.

** Remember to include a salary for yourself and any other family members who are actively working in the business

***if you are using land that you already own, you may be able to charge rent to yourself for that land is actively being used for your aquaculture venture.

***Pro forma* cash flow budget (quarterly)**
This should be projected forward for 3 to 5 years

Item	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Beginning Cash Receipts				
Cash Inflow				
Operating Expenses (inputs) Fingerlings Feed Fuel Chemicals Labor Harvesting Repairs/Maintenance Insurance Other Total				
Other Expenses				
Scheduled Debt Payments Real Estate principal Interest Equipment Principal Interest Operating Principal Interest				
Ownership Costs Depreciation Taxes Insurance Total				
Total Cash Outflow				
Cash Available				
New Borrowing				
Cash Balance				
Debt Outstanding Real Estate Equipment Operating				

References:

Hinshaw, Jeffrey M., Lindsay E. Rogers and James E. Easley. *Budgets for Trout Production Estimated Costs and Returns for Trout Farming in the South.* Southern Regional Aquaculture Center Publication No. 221. January 1990.

Avery, Jimmy, Robert P. Romaire and W. Ray McClain. *Crawfish Production Production Economics, Pond and Water Supply.* Southern Regional Aquaculture Center Publication No. 240. October 1998 Revision.

De la Bretonne, Jr. Larry and Robert P. Romaire. *Crawfish Production, Harvesting, Marketing and Economics.* Southern Regional Aquaculture Center Publication No.242. January 1990.

Dunning Rebecca D., Thomas M. Losordo and Alex O. Hobbs. *The Economics of Recirculating Tank Systems: A spreadsheet for Individual Analysis.* Southern Regional Aquaculture Center Publication No. 456. November 1998.

Lipton, Douglas W. and Reginal M. Harrell. *Figuring Production Costs in Finfish Aquaculture.* Finfish Aquaculture Workbook Series. Cooperative Extension Service. Maryland Institute for Agriculture and Natural Resources Publication No. UM-SG-MAP-90-02.

Hanson, J.S., W. Griffin. D. Klinefelter and D. Fisher. *Writing an Aquaculture Business Plan.*USDA Aquaculture II CD-ROM Information System

Engle, Carole R. and Nathan M. Stone. *Developing Business Proposals for Aquaculture Loans.* Southern Regional Aquaculture Center Publication No. 381. March 1997

Beem, Marley. *Aquaculture: Realities and Potentials When Getting Started.* Southern Regional Aquaculture Center Publication No.441. November 1998.

SBA's Guidelines of Borrowing

Summary

Some small business persons cannot understand why a lending institution refused to lend them money. Others have no trouble getting funds, but they are surprised to find strings attached to their loans. Such owner-managers fail to realize that banks and other lenders have to operate by certain principles just as do other types of business.

This publication discusses the following fundamentals of borrowing: (1) credit worthiness, (2) kinds of loans, (3) amount of money needed, (4) collateral, (5) loan restrictions and limitations, (6) the loan application, and (7) standards which the lender uses to evaluate the application.

Introduction

Inexperience with borrowing procedures often creates resentment and bitterness. The stories of three small business persons illustrate this point.

"I'll never trade here again," Bill Smith* said when his bank refused to grant him a loan. "I'd like to let you have it, Bill," the banker said, "but your firm isn't earning enough to meet your current obligations." Mr. Smith was unaware of a vital financial fact, namely, that lending institutions have to be certain that the borrower's business can repay the loan.

Tom Jones lost his temper when the bank refused him a loan because he did not know what kind or how much money he needed. "We hesitate to lend," the banker said, "to business owners with such vague ideas of what and how much they need."

John Williams' case was somewhat different. He didn't explode until after he got the loan. When the papers were ready to sign, he realized that the loan agreement put certain limitations on his business activities. "You can't dictate to me," he said and walked out of the bank. What he didn't realize was that the limitations were for his good as well as for the bank's protection.

Knowledge of the financial facts of business life could have saved all three the embarrassment of losing their tempers. Even more important, such information would have helped them to borrow money at a time when their businesses needed it badly.

This publication is designed to give the highlights of what is involved in sound business borrowing. It should be helpful to those who have little or no experience with borrowing. More experienced owner-managers should find it useful in re-evaluating their borrowing operations.

***All names in this publication are fictitious**

Is Your Firm Credit Worthy?

The ability to obtain money when you need it is as necessary to the operation of your business as is a good location or the right equipment. Before a bank or any other lending agency will lend you money, the loan officer must feel satisfied with the answers to the five following questions:

1. What sort of person are you, the prospective borrower? By all odds, the character of the borrower comes first. Next is your ability to manage your business.
2. What are you going to do with the money? The answer to these questions will determine the type of loan, short or long-term. Money to be used for the purchase of seasonal inventory will require quicker repayment than money used to buy fixed assets.
3. When and how do you plan to pay it back? Your banker's judgment of your business ability and the type of loan will be a deciding factor in the answer to this question.
4. Is the cushion in the loan large enough? In other words, does the amount requested make suitable allowance for unexpected developments? The banker decides this question on the basis of your financial statement, which sets forth the condition of your business and on the collateral pledged.
5. What is the outlook for business in general and for your business particularly?

Adequate Financial Data Is a "Must." The banker wants to make loans to businesses, which are solvent, profitable, and growing. The two basic financial statements used to determine those conditions are the balance sheet and profit-and-loss statement. The former is the major yardstick for solvency and the latter for profits. A continuous series of these two statements over a period of time is the principal device for measuring financial stability and growth potential. In interviewing loan applicants and in studying their records, the banker is especially interested in the following facts and figures.

General Information: Are the books and records up-to-date and in good condition? What is the condition of accounts payable? Of notes payable? What are the salaries of the owner-manager and other company officers? Are all taxes being paid currently? What is the order backlog? What is the number of employees? What is the insurance coverage?

Accounts Receivable: Are there indications that some of the accounts receivable have already been pledged to another creditor? What is the accounts receivable turnover? Are the accounts receivable total weakened because many customers are far behind in their payments? Has a large enough reserve been set up to cover doubtful accounts? How much do the largest accounts owe and what percentage of your total accounts does this amount represent?

Inventories: Is merchandise in good shape or will it have to be marked down? How much raw material is on hand? How much work is in process? How much of the inventory is finished goods? Is there any obsolete inventory? Has an excessive amount of inventory been consigned to customers? Is inventory turnover in line with the turnover for other businesses in the same industry? Or is money being tied up too long in inventory?

Fixed Assets: What is the type, age, and condition of the equipment? What are the depreciation policies? What are the details of mortgages or conditional sales contracts? What are the future acquisition plans?

What Kind of Money?

When you set out to borrow money for your firm, it is important to know the kind of money you need from a bank or other lending institution. There are three kinds of money: short term, term money, and equity capital.

Keep in mind that the purpose for which the funds are to be used is an important factor in deciding the kind of money needed. But even so, deciding what kind of money to use is not always easy. It is sometimes complicated by the fact that you may be using some of the various kinds of money at the same time and for identical purposes.

Keep in mind that a very important distinction between the types of money is the source of repayment. Generall**y, short-term loans are repaid from the liquidation of current assets, which they** have financed. Long-term **loans are usually repaid from earnings.**

Short-Term Bank Loans You can use short-term bank loans for purposes such as financing accounts receivable for, say 30 to 60 days. Or you can use them for purposes that take longer to pay off--such as for building a seasonal inventory over a period of 5 to 6 months. Usually, lenders expect short term loans to be repaid after their purposes have been served: for example, accounts receivable loans, when the outstanding accounts have been paid by the borrower's customers, and inventory loans, when the inventory has been converted into saleable merchandise.

Banks grant such money either on your general credit reputation with an unsecured loan or on a secured loan.

The unsecured loan is the most frequently used form of bank credit for short-term purposes. You do not have to put up collateral because the bank relies on your credit reputation.

The secured loan involves a pledge of some or all of your assets. The bank requires security as a protection for its depositors against the risks that are involved even in business situations where the chances of success are good.

Term Borrowing Term borrowing provides money you plan to pay back over a fairly long time. Some people break it down into two forms: (1) intermediate--loans longer than 1 year but less than 5 years, and (2) long-term--loans for more than 5 years.

However, for your purpose of matching the kind of money to the needs of your company, think of term borrowing as a kind of money, which you probably will pay back in periodic installments from earnings.

Equity Capital Some people confuse term borrowing and equity (or investment) capital. Yet there is a big difference. You don't **have to repay equity money.** It is **money** you get by selling interest in your business.

Take people into your company who are willing to risk their money in it. They are interested in potential income rather than in an immediate return on their investment.

How Much Money?

The amount of money you need to borrow depends on the purpose for which you need funds. Figuring the amount of money required for business construction, conversion, or expansion--term loans or equity capital is relatively easy. Equipment manufacturers, architects, and builders will readily supply you with cost estimates. On the other hand, the amount of working capital you need depends upon the type of business you're in. While rule-of-thumb ratios may be helpful as a starting point, a detailed projection of sources and uses of funds over some future period of time usually for 12 months is a better approach. In this way, the characteristics of the particular situation can be taken into account. Such a projection is developed through the combination of a predicted budget and a cash forecast.

The budget is based on recent operating experience plus your best judgment of performance during the coming period. The cash forecast is your estimates of cash receipts and disbursements during the budget period. Thus, the budget and the cash forecast together represent your plan for meeting your working capital requirements.

To plan your working capital requirements, it is important to know the "cash flow" which your business will generate. This involves simply a consideration of all elements of cash receipts and disbursements at the time they occur. These elements are listed in the profit-and loss statement, which has been adapted to show cash flow. They should be projected for each month.

What Kind of Collateral?

Sometimes, your signature is the only security the bank needs when making a loan. At other times, the bank requires additional assurance that the money will be repaid. The kind and amount of security depends on the bank and on the borrower's situation.

If the borrower’s financial statements alone cannot justify the loan required, a pledge of security may bridge the gap. The types of security are: endorsers; co makers and guarantors; assignment of leases; trust receipts and floor planning; chattel mortgages; real estate; accounts receivables; savings accounts; life insurance policies; and stocks and bonds. In a substantial number of States where the Uniform Commercial Code has been enacted, paperwork for recording loan transactions will be greatly simplified.

Endorsers, Co-makers, and Guarantors Borrowers often get other people to sign a note in order to bolster their own credit. These **endorsers** are contingently liable for the note they sign. If the borrower **fails to pay up,** the bank expects the endorser to make the note good. Sometimes, the endorser may be asked to **pledge assets or securities** too.

A **co-maker** is one who creates an obligation jointly with the borrower. In such cases, the bank can collect directly from either the maker or the co-maker.

A **guarantor** is one who guarantees the payment of a note by signing a guaranty commitment. Both private and government lenders often require guarantees from officers of corporations in order to assure continuity of effective management. Sometimes, a manufacturer will act as guarantor for customers.

Assignment of Leases
The assigned lease as security is similar to the guarantee. It is used, for example, in some franchise situations.

The bank lends the money on a building and takes a mortgage. Then the lease, which the dealer and the parent franchise company work out, is assigned so that the bank automatically receives the rent payments. In this manner, the bank is guaranteed repayment of the loan.

Warehouse Receipts
Banks also take commodities as security by lending money on a warehouse receipt. Such a receipt is usually delivered directly to the bank and shows that the merchandise used as security either has been placed in a public warehouse or has been left on your premises under the control of one of your employees who is bonded (as in field warehousing). Such loans are generally made on staple or standard merchandise, which can be readily marketed. The typical warehouse receipt loan is for a percentage of the estimated value of the goods used as security.

Trust Receipts and Floor Planning
Merchandise, such as automobiles, appliances, and boats, has to be displayed to be sold. The only way many small marketers can afford such displays is by borrowing money. Such loans are often secured by a note and a trust receipt.

This trust receipt is the legal paper for floor planning. It is used for serial-numbered merchandise. When you sign one, you (1) acknowledge receipt of the merchandise, (2) agree to keep the merchandise in trust for the bank, and (3) promise to pay the bank as you sell the goods.

Chattel Mortgages
If you buy equipment such as a cash register or a delivery truck, you may want to get a chattel mortgage loan. You give the bank a lien on the equipment you are buying.

The bank also evaluates the present and future market value of the equipment being used to secure the loan. How rapidly will it depreciate? Does the borrower have the necessary fire, theft, property damage, and public liability insurance on the equipment? The banker has to be sure that the borrower protects the equipment.

Real Estate Real estate is another form of collateral for long-term loans. When taking a real estate mortgage, the bank finds out: (1) the location of the real estate, (2) its physical condition, (3) its foreclosure value, and (4) the amount of insurance carried on the property.

Accounts Receivable Many banks lend money on accounts receivable. In effect, you are counting on your customers to pay your note.

The bank may take accounts receivable on a notification or a non-notification plan. Under the **notification** plan, the bank informs the purchaser of the goods that his or her account has been assigned to it and he or she is asked to pay the bank. Under the **non-notification** plan, the borrower's customers continue to pay you the sums due on their accounts and you pay the bank.

Savings Accounts Sometimes, you might get a loan by assigning to the bank a savings account. In such cases, the bank gets an assignment from you and keeps your passbook. If you assign an account in another bank as collateral, the lending bank asks the other bank to mark its records to show that the account is held as collateral.

Life Insurance Another kind of collateral is life insurance. Banks will lend up to the cash value of a life insurance policy. You have to assign the policy to the bank.

If the policy is on the life of an executive of a small corporation, corporate resolutions must be made authorizing the assignment. Most insurance companies allow you to sign the policy back to the original beneficiary when the assignment to the bank ends.

Some people like to use life insurance as collateral rather than borrow directly from insurance companies. One reason is that a bank loan is often more convenient to obtain and usually may be obtained at a lower interest rate.

Stocks and Bonds If you use stocks and bonds as collateral, they must be marketable. As a protection against market declines and possible expenses of liquidation, banks usually lend no more than 75 percent of the market value of high grade stock. On Federal Government or municipal bonds, they may be willing to lend 90 percent or more of their market value.

The bank may ask the borrower for additional security or payment whenever the market value of the stocks or bonds drops below the bank's required margin.

What Are the Lender's Rules?

Lending institutions are not just interested in loan repayments. They are also interested in borrowers with healthy profit-making businesses. Therefore, whether or not collateral is required for a loan, they set loan limitations and restrictions to protect themselves against unnecessary risk and at the same time against poor management practices by their borrowers. Often some owner-managers consider loan limitations a burden. Yet others feel that such limitations also offer an opportunity for improving their management techniques.

Especially in making long-term loans, the borrower as well as the lender should be thinking of: (1) the net earning power of the borrowing company, (2) the capability of its management, (3) the long range prospects of the company, and (4) the long range prospects of the industry of which the company is a part. Such factors often mean that limitations increase as the duration of the loan increases.

What Kinds of Limitations?

The kinds of limitations which an owner-manager finds set upon the company depends, to a great extent, on the company. If the company is a good risk only minimum limitations need be set. A poor risk, of course, is different. Its limitations should be greater than those of a stronger company.

Look now for a few moments at the kinds of limitations and restrictions, which the lender may set. Knowing what they are can help you see how they affect your operations.
The limitations, which you will usually run into when you borrow money, are:

1. Repayment terms.

2. Pledging or the use of security.

3. Periodic reporting.

A loan agreement, as you may already know, is a tailor made document covering, or referring to, all the terms and conditions of the loan. With it, the lender does two things: (1) protects position as a creditor (keeps that position in as protected a state as it was on the date the loan was made and (2) assures repayment according to the terms.

The lender reasons that the borrower's business should **generate enough funds** to repay the loan while taking care of other needs. The lender considers that cash inflow should be great enough to do this without hurting the working capital of the borrower.

Covenants--Negative and Positive The actual restrictions in a loan agreement come under a section known as covenants. Negative covenants are things, which the borrower may not do without prior approval from the lender. Some examples are: further additions to the borrower's total debt, nonpledge to others of the borrower's assets, and issuance of dividends in excess of the terms of the loan agreement.

On the other hand, positive covenants spell out things, which the borrower must do. Some examples are: (I) maintenance of a minimum net working capital. (2) carrying of adequate insurance, (3) repaying the loan according to the terms of the agreement, and (4) supplying the lender with financial statements and reports.

Overall, however, loan agreements may be amended from time to time and exceptions made. Certain provisions may be waived from one year to the next with the consent of the lender.

You can negotiate next time you go to borrow money, evaluate t the lending terms before you sign. It is good practice no matter how badly you may need the money. Ask to see the papers in advance of the loan closing. Legitimate lenders are glad to cooperate.

Chances are that the lender may "give" some on the terms. Keep in mind also that, while you're mulling over the terms, you may want to get the advice of your associates and outside advisors. In short, try to get terms you know your company can live with. Remember, however, that once the terms have been agreed upon and the loan is made (or authorized as in the case of SBA), you are bound by them.

The Loan Application

Now you have read about the various aspects of the lending process and are ready to apply for a loan. Banks and other private lending institutions, as well as the Small Business Administration, require a loan application on which you list certain information about your business.

For the purposes of explaining a loan application, this publication uses the Small Business Administration's application for a loan (SBA Form 4 not included). The SBA form is more detailed than most bank forms. The bank has the advantage of prior knowledge of the applicant

and his or her activities. Since SBA does not have such knowledge, its form is more detailed. Moreover, the longer maturities of SBA loans ordinarily will necessitate more knowledge about the applicant.

Before you get to the point of filling out a loan application, you should have talked with an SBA representative, or perhaps your accountant or banker, to make sure that your business is eligible for an SBA loan. Because of public policy, SBA cannot make certain types of loans. Nor can it make loans under certain conditions. For example, if you can get a loan on reasonable terms from a bank, SBA cannot lend you money. The owner-manager is also not eligible for an SBA loan if he or she can get funds by selling assets which his or her company does not need in order to grow.

When the SBA representative gives you a loan application, you will notice that most of its sections ("Application for Loan" SBA Form 4) are self-explanatory. However, some applicants have trouble with certain sections because they do not know where to go to get the necessary information.

Section 3--"Collateral Offered" is an. example. A company's books should show the net value of assets such as business real estate and business machinery and equipment. "Net" means what you paid for such assets less depreciation.

If an owner-manager's records do not contain detailed information on business collateral, such as real estate and machinery and equipment, the bank sometimes can get it from your Federal income tax returns. Reviewing the depreciation, which you have taken for tax purposes on such collateral, can be helpful in arriving at the value of these assets.

A good manager, will balance account books monthly. However, some businesses prepare balance sheets less regularly. In filling out your "Balance Sheet as of , 19 , Fiscal Year Ends ," remember that you must show the condition of you business within 60 days of the date on your loan application. It is best to get expert advice when working up such vital information. Your accountant or banker will be able to help you.

Again, if your records do not show the details necessary for working up profit and loss statements, your Federal income tax returns may be useful in getting together facts for the SBA loan application.

Insurance SBA also needs information about the kinds of insurance a company carries. The owner-manager gives these facts by listing various insurance policies.

Personal Finances SBA also must know something about the personal financial condition of the applicant. Among the types of information are: personal cash position; source of income including salary and personal investments; stocks, bonds, real estate, and other property owned in the applicant's own name; personal debts including installment credit payments, life insurance premiums, and so forth.

Evaluating the Application

Once you have supplied the necessary information, the next step in the borrowing process is the evaluation of your application. Whether the processing officer is in a bank or in SBA, the officer considers the same kinds of things when determining whether to grant or refuse the loan. The SBA loan processor looks for:

1. The borrower's debt paying record to suppliers, banks, home mortgage holders, and other creditors.
2. The ratio of the borrower's debt to net worth.
3. The past earnings of the company.
4. The value and condition of the collateral, which the borrower offers for security.

The SBA loan processor also looks for: (1) the borrower's management ability, (2) the borrower's character, and (3) the future prospects of the borrower's business.

Cash Budget For three months, ending March 31, 200__

	January		February		March	
	Budget	Actual	Budget	Actual	Budget	Actual
Expected Cash Receipts:						
1. Cash sales						
2. Collections on accounts receivable						
3. Other income						
4. Total cash receipts						
Expected Cash Payments						
5. Raw materials						
6. Payroll						
7. Other factory expenses (including maintenance)						
8. Advertising						
9. Selling expense						
10. Administrative expense (including salary of owner-manager)						
11. New plant and equipment						
12. Other payments(taxes, including estimated income tax; repayment of loans; interest; etc.)						
13. Total cash payments						
14, Expected Cash Balance at beginning of the month						
15. Cash increase of decrease (item 4 minus item 13)						
16. Expected cash balance at end of month (item 14 plus item						
17. Desired working cash balance						
18. Short-term loans needed (item 17 minus item 16, if item 17 is larger)						
19. Cash available for dividends, capital cash expenditures, and/or short investments (item 16 minus item 17, if item 16 is larger than item 17)						
Capital Cash:						
20. Cash available (item 19 after deducting dividends, etc.)						
21. Desired capital cash (item 11, new plant equipment)						
22. Long-term loans needed (item 21 less item 20, if item 20 is larger than item 20)						

We hope this publication has met your business needs. For a free copy of the Directory of Business Development Publications, write to: Publications, P.O. Box 1000, Fort Worth, Texas 76119 or contact your local SBA office.

SBA has a number of other programs and services available. They include training and educational programs, advisory services, financial programs, and contract assistance. Our offices are located throughout the country. For the one nearest you, consult the telephone directory under U.S. Government or call the Small Business Answer Desk at 1-800-368-5855. In Washington, D.C., call 653-7561.

CROP INSURANCE

Stock Mortality Insurance may be available for your aquaculture operation. Most of the insurance is available through private companies. For a listing of these companies, you may either contact the NJDA at the telephone number in **Attachment H** or contact your local Farm Service Agency. A listing of your local Farm Service Agency contacts is included in **Attachment I.**

Federal **crop insurance** protects farmers or ranchers from unexpected production losses from natural causes, including drought, excessive moisture, hail, wind, flooding, hurricanes, tornadoes, and lightning. It does not cover losses resulting from neglect, poor farming practices, theft, or low prices.

Recent legislation replaced traditional crop disaster assistance with new, enhanced **crop insurance** programs. These are the Catastrophic (CAT) Program and the Noninsured Crop Disaster Assistance Program (NAP).

Catastrophic coverage compensates a farmer for crop losses greater than 50 percent of the operation's average yield, at 60 percent of the expected market price. CAT can be obtained at local FSA offices in most States or from private **crop insurance** agents for a nominal processing fee. This fee may be waived for limited-resource farmers. Higher levels of insurance protection are available through private **crop insurance** agents. USDA subsidizes the premiums for these policies to encourage farmers to take advantage of them. Buying this additional coverage is the only way farmers can benefit from attractive policy features permitting smaller operational units, replanting payments, and coverage for certain quality losses.

Producers who decide not to buy **crop insurance** when it is available still may participate in USDA's commodity, conservation, and credit programs. However, they must sign a waiver agreeing to give up eligibility for emergency crop disaster assistance. This waiver does not disqualify an eligible producer from getting an FSA farm credit programs emergency loan or a payment under NAP. Any producer who signs a waiver, and subsequently decides to buy **crop insurance**, becomes eligible for disaster assistance for the insured crop.

The **Noninsured Crop Disaster Assistance Program** protects growers of many crops for which Federal **crop insurance** is not available. In addition, any losses resulting from natural disasters not covered by the **crop insurance** policy may also be eligible.

NAP assistance is available for crops grown commercially for food and fiber. Floriculture, ornamental nursery products, Christmas tree crops, turfgrass sod, seed crops, **aquaculture (including ornamental fish)**, and industrial crops are also included.

FSA makes NAP payments to eligible producers when both the expected "area" yield is less than 65 percent of normal, and individual crop losses are in excess of 50 percent of the average yield. If these conditions are met, the Agency pays 60 percent of the expected market price for each unit of production lost above 50 percent.

Unlike previous disaster assistance programs, to be eligible for NAP, producers must annually file an acreage and production report with the local FSA office. If a farmer does not report acres and yields by the yearly deadline, NAP assistance may be withheld following a major crop loss.

To summarize, the following must happen:

1. The farmer must file an acreage and production report with the local FSA office annually.
2. The expected area yield must be less than 65% of normal and individual crop loss must be in excess of 50% of the average yield; or
3. The farmer must have been prevented from planting 35% of his/her intended acreage due to the natural disaster. The determent must be reasonably related to the basis for the area's designation.

If these conditions are met, FSA will pay 60% of the expected market price for each unit of production lost above 50% for each approved crop in an area approved by the Commodity Credit Corporation (CCC).

Further information and applications for the program are available at local FSA county offices. They are usually listed in the telephone directory in the government/public organizations section under "U.S. Department of Agriculture, Farm Service Agency".

NOTE: No person shall receive payments for a crop year in excess of $100,000. If a producer is eligible to receive NAP assistance and benefits under any other program administered by the secretary for the same loss, the producer must choose whether to receive the other program benefits or NAP assistance. **The producer is not eligible for both.**

For more information on NAP or CAT insurance, contact your local FSA office listed in ***Attachment I.***

POTENTIAL SOURCES OF GRANT MONEY

SMALL BUSINESS INNOVATION RESEARCH (SBIR Program)

Federal Agency: Cooperative State Research, Education And Extension Service, Department Of Agriculture

Objectives: To stimulate technological innovation in the private sector, strengthen the role of small businesses in meeting Federal research and development needs, increase private sector commercialization of innovations derived from USDA-supported research and development efforts, and foster and encourage participation, by women-owned and socially disadvantaged small business firms in technological innovation.

Types Of Assistance: Project Grants.

Uses And Use Restrictions: The selected areas for research are forests and related resources; plant production and protection; animal production and protection; air, water, and soils; food science and nutrition; rural and community development; aquaculture; industrial applications; and marketing and trade. The Small Business Innovation Research Program will be carried out in three separate phases: Phase I, USDA anticipates making awards during fiscal year 1998 to small businesses in amounts ranging up to $65,000 over periods normally not to exceed six months each. Phase I is to determine the scientific or technical feasibility of ideas submitted by proposers on the selected research areas; Phase II awards will be made during fiscal year 1998 to firms with approaches that appear sufficiently promising as a result of phase I studies. Only those small businesses previously receiving phase I awards in either fiscal years 1996 or 1997 are eligible to submit phase II proposals in fiscal year 1998. Phase II projects are limited to $250,000 with the average award being about $200,000, for a period normally not to exceed 24 months; phase III is to be conducted by the small business concern (including joint ventures and limited partnerships), and will be non-SBIR funded through the exercising of a follow-on funding commitment. The purpose of phase III is to stimulate technological innovation and the national return on investment from research through the pursuit of commercialization objectives resulting from the USDA-supported work carried out in phases I and II.

Applicant Eligibility: Small businesses which: (a) Are organized for profit, independently owned or operated, are not dominant in the proposed research field, have their principal places of business located in the United States, have a number of employees not exceeding 500 in all affiliated firms owned or controlled by a single parent concern, and meet the other regulatory requirements outlined in 13 CFR Part 121, as amended; (b) are at least 51 percent owned, or in the case of a publicly owned business, at least 51 percent of its voting stock is owned, by U.S. citizens or lawfully admitted permanent resident aliens; (c) are the primary source of employment for the principal investigator of the proposed effort at the time of award and during the actual conduct of proposed research; (d) are the primary performer of the proposed research effort. Because this program is intended to increase the use of small business firms in Federal research or research and development, the term "primary performer" means that a minimum of two-thirds of the research or analytical work, as determined by budget expenditures, must be performed by the proposing organization under phase I grants. For phase II awards, a minimum of one-half of the research or analytical effort must be conducted by the proposing firm.

Information Contacts: Headquarters Office: SBIR Director, Cooperative State Research, Education, and Extension Service, Department of Agriculture, Ag Box 2243, 14th and Independence Ave., SW., Washington, DC 20250-2243. Telephone: (202) 401-4002 website:http://www.sba.gov/sbir/indexsbir-sttr.html

SUSTAINABLE AGRICULTURE RESEARCH AND EDUCATION

Federal Agency: Cooperative State Research, Education, And Extension Service, Department Of Agriculture

Objectives: To facilitate and increase scientific investigation and education in order to reduce the use of chemical pesticides, fertilizers and toxic materials in agricultural production; to improve management of on-farm resources to enhance productivity, profitability and competitiveness; to promote crop, livestock and enterprise diversification and to facilitate the conduct of research projects in order to study agricultural production systems that are located, in areas that possess various soil, climatic, and physical characteristics; to study farms that have been and continue to be managed using farm production practices that optimize the use of on-farm resources and conservation practices; to take advantage of the experience and expertise of farmers and ranchers through their direct participation and leadership in projects; to transfer practical, reliable and timely information to farmers and ranchers concerning sustainable practices and systems; and to promote a partnership between farmers, nonprofit organizations, agribusiness and public and private research and extension institutions.

Types Of Assistance: Project Grants.

Uses And Use Restrictions: Funds may not be used to pay indirect costs or tuition. Funds may be used for transportation, per diem, salaries, office supplies, printing, and other direct costs for conducting approved activities.

Applicant Eligibility: Land-grant colleges or universities, other universities, State agricultural experiment stations, State cooperative extension services, nonprofit organizations, and individuals with demonstrable expertise, or Federal or State governmental entities.

Information Contacts: Headquarters Office: Cooperative State Research, Education, and Extension Service, Department of Agriculture, Ag Box 2201, Washington, DC 20250-2201. Contact: Acting Administrator. Telephone: (202) 720-4423.
website: http://www.csrees.usda.gov/ProgView.cfm?prnum=1362

COMMUNITY FOOD PROJECTS (Community Food Project Program)

Federal Agency: Cooperative State Research, Education, And Extension Service, Department Of Agriculture

Objectives: To support the development of community food projects designed to meet the food needs of low-income people; increase the self-reliance of communities in providing for their own needs; and promote comprehensive responses to local food, farm, and nutrition issues.

Types Of Assistance: Project Grants.

Uses And Use Restrictions: Community food projects are intended to take a comprehensive approach to developing long-term solutions that help to ensure food security in communities by linking the food sector to community development, economic opportunity, and environmental enhancement. Comprehensive solutions may include elements such as: (1)Improved access to high quality, affordable food among low-income households; (2) support for local food systems, from urban gardening to local farms that provide high quality fresh food, ideally with minimal adverse environmental impact; and (3) expanded economic opportunities for community residents through local business or other economic development, improved employment opportunities, job training, youth apprenticeship, school-to-work transition, and the like. Any solution proposed must tie into community food needs. Successful applicants must provide matching funds, either in cash or in-kind amounting to at least 50 percent of the total cost of the project during the term of the grant award.

Applicant Eligibility: Proposals may be submitted by private nonprofit entities. Because projects must promote comprehensive responses to local food, farm, and nutrition issues, applicants are encouraged to seek and create partnership among public, private nonprofit and private for-profit organizations or firms. To be further eligible for a grant, a private nonprofit applicant must meet three mandatory requirements: 1. Have experience in the area of: (a) community food work, particularly concerning small and medium-sized farms, including the provision of food to people in low-income communities and the development of new markets in low-income communities for agricultural producers; or (b) job training and business development activities in low-income communities; 2. demonstrate competency to implement a project, provide fiscal accountability and oversight, collect data, and prepare reports and other appropriate documentation; and 3. demonstrate a willingness to share information with researchers, practitioners, and other interested parties.

Information Contacts: Headquarters Office: Administrator, Cooperative State Research, Education, and Extension Service, Department of Agriculture, Stop 2201, Washington, DC 20250-2201. Telephone: (202) 720-4423. website: http://www.csrees.usda.gov/nea/food/in_focus/hunger_if_competitive.html

ALTERNATIVE AGRICULTURAL RESEARCH AND COMMERCIALIZATION PROGRAM (AARC CORPORATION)

Federal Agency: Alternative Agricultural Research And Commercialization (Aarc) Corporation, Department Of Agriculture

Objectives: To search for new industrial (non-food, non-feed) products that may be produced from agricultural commodities and for processes to produce such products. To conduct product, and co-product/process development and demonstration projects, as well as provide commercialization assistance for bio-based industrial products from agricultural and forestry materials and animal by-products. To encourage cooperative development and marketing efforts among manufacturers, private and government laboratories, universities, and financiers to assist in bridging the gap between research results and marketable, competitive products and processes. To collect and disseminate information about commercialization projects that use agricultural or forestry materials and industrial products derived there from.

Types Of Assistance: Project Grants (Cooperative Agreements).

Uses And Use Restrictions: Pre-proposals/proposals should focus on products/processes from the following material categories: Starches/carbohydrates, fats and oils, fibers, forest materials, animal products, other plant materials used as pharmaceutical, fine chemicals, encapsulation agents, rubber, etc. Primary interest is in providing assistance to technology development projects that will commercialize new industrial (non-food, non-feed) uses from new and existing agricultural and forestry materials. Special emphasis will be given to those pre-proposals/proposals whose products are closest to commercialization. Pre-proposals/proposals that request funds for research may be considered; however, such requests must include an overall development plan that contains potential markets, development costs, and industry participation. No grant or cooperative agreement/equity investment may be entered into for the acquisition or construction of a building or facility. Not more than 25 percent of the funds obligated each fiscal year shall be awarded only for projects concerning new products derived from animal sources.

Applicant Eligibility: Public and private educational and research institutions and organizations, Federal agencies, and individuals. Preference is given to private firms, which will operate, in or near rural areas or rural communities.

Information Contacts: Headquarters Office: Executive Director, Alternative Agricultural Research and Commercialization (AARC) Corporation, 0156 South Building, Department of Agriculture, Ag Box 0401, Washington, DC 20250-0401. Fax: (202) 690-1655. Use the same number for FTS. Website: http://www.usda.gov/oce/sdsf2/sdlinks.htm

FARM OPERATING LOANS

Federal Agency: Farm Service Agency, Department Of Agriculture

Objectives: To enable operators of not larger than family farms through the extension of credit and supervisory assistance, to make efficient use of their land, labor, and other resources, and to establish and maintain financially viable farming and ranching operations.

Types Of Assistance: Direct Loans; Guaranteed/Insured Loans.

Uses And Use Restrictions: Loan funds may be used to: (1) Purchase livestock, poultry, fur bearing and other farm animals, fish, and bees;(2) purchase farm equipment; (3) provide operating expenses for farm enterprise; (4) meet family subsistence needs and purchase essential home equipment; (5) refinance secured and unsecured debts subject to certain restrictions; (6) pay property taxes; (7) pay insurance premiums on real estate and personal property; and (8) finance youth projects. Use restrictions are shown under Applicant Eligibility.

Applicant Eligibility: Except for youth loans, individual applicants must: 1) Have the necessary education and/or farm experience or training (1 year's complete production and marketing cycle within the last 5 years) 2) Do not exceed the limitation on the number of years that assistance may be received; 3) possess the legal capacity to incur the obligations of the loan; 4) be unable to obtain sufficient credit elsewhere at reasonable rates, and terms; 5) project the ability to repay the loan; 6) be a citizen or permanent resident of the United States; 7) after the loan is closed, be an owner/tenant operator of a family farm; and 8) comply with the highly erodible

land and wetland conservation provisions of Public Law 99-198 of the Food Security Act of 1985 (FSA); Certain corporations, cooperatives, partnerships and joint operations ("entities") operating family-sized farms are also eligible for farm operating loans. In brief, entity applicants must meet some of the same eligibility requirements as individual applicants. In addition, if members, stockholders or shareholders of the entity are related by blood or marriage, at least one stockholder, shareholder partner or joint operator must operate the family-sized farm. In the case when members are not related by blood or marriage, the majority interest holders in the entity must actually operate the family-sized farm to be eligible. The entity must be authorized to operate a farm in the State in which it is located. Limited resource applicants must meet the above requirements. In addition, they must have a low income and show a need for increased farm income. In the case of limited resource entities, all the partners, joint operators, members, or stockholders must be citizens and the entity must be the owner-operator of the family farm with at least one partner, joint operator, member or stockholder operating the farm. Assistance is authorized for eligible applicants in the 50 States, the Commonwealth of Puerto Rico, the Virgin Islands of the United States, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and to the extent the Secretary determines it to be feasible and appropriate, the Trust Territories of the Pacific Islands. To be eligible to obtain a direct or guaranteed loan, a borrower must agree to abide by any "borrower training" requirements.

Information Contacts: Regional or Local Office: Contact the appropriate RECD/FSA State Office listed in your local telephone directory. **Headquarters Office:** Department of Agriculture, Farm Service Agency, Director, Loan Making Division, Ag Box 0522, Washington, DC 20250. Telephone: (202) 720-1632. Website: http://www.fsa.usda.gov/dafl/default.htm

FARM OWNERSHIP LOANS

Federal Agency: Farm Service Agency Department Of Agriculture

Objectives: To assist eligible farmers, ranchers, and aquaculture operators, including farming cooperatives, corporations, partnerships, and joint operations, through the extension of credit and supervisory assistance to: Become owner-operators of not larger than family farms; make efficient use of the land, labor, and other resources; carry on sound and successful farming operations; and enable farm families to have a reasonable standard of living.

Types Of Assistance: Direct Loans; Guaranteed/Insured Loans.

Uses And Use Restrictions: Loan funds may be used to: (1) Enlarge, improve, and buy family farms; (2) provide necessary water and water facilities; (3) provide basic soil treatment and land conservation measures; (4) construct, repair, and improve essential buildings needed in the operation of a family farm; (5) construct or repair farm dwellings; (6) provide facilities to produce fish under controlled conditions.

Applicant Eligibility: An applicant must: (1) Be unable to obtain suitable credit from other sources at reasonable rates and terms; (2) be a U.S. citizen or permanent resident and possess the legal capacity to incur the obligations of the loan; (3) have the necessary education and/or experience, training, and managerial ability to operate a family farm; (4) realistically project the ability to repay the loan; (5) be the owner-operator of a not larger than family farm after the loan is closed; and (6) if an individual, the applicant must not have a combined farm ownership, soil and water, and recreation loan indebtedness to FSA of more than $200,000, for direct loans;

and $300,000 for a guaranteed loan(s), or a combination of direct and guaranteed indebtedness; or a total indebtedness against the property securing the loan(s) of more than the market value of the security, whichever is the lesser amount. If a cooperative, corporation, joint operation or partnership, the entity must be controlled by farmers or ranchers engaged primarily and directly in farming in the U.S., after the loan is made, and must consist of members, stockholders, partners, or joint operators (7) have a minimum of 3 years farming experience. Assistance is authorized for eligible applicants in the 50 States, the Commonwealth of Puerto Rico, the Virgin Islands of the United States, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and, to the extent the Secretary determines it to be feasible and appropriate, the Trust Territories of the Pacific Islands. Applicants must also comply with the highly erodible land and wetland conservation provisions of Public Law 99-198 of the Food Security Act of 1985 (FSA). To be eligible to obtain a direct or guaranteed loan, a borrower must abide by the Agency's borrower training requirements.

Information Contacts: Regional or Local Office: Contact the appropriate FSA State Office listed in your local telephone directory. **Headquarters Office:** Department of Agriculture, Farm Service Agency, Director, Loan Making Division, Ag Box 0522, Washington, DC 20250. Telephone: (202) 720-1632. Website: http://www.fsa.usda.gov/dafl/default.htm

THE NATIONAL MARINE FISHERIES SERVICES OFFERS AQUACULTURE FINANCING THROUGH THREE BRANCH OFFICES. AVAILABLE SERVICES INCLUDE:

Direct long-term loans for capital projects
Maturities up to 25 years (not to exceed the project property's useful life)
Net interest costs 2% above U.S.
Treasury's cost to borrow public funds
Amounts up to 80% of project property's depreciated actual cost
Loans for aquatic farms can include the land

Credit standards and requirements:

- Good earnings record, net worth, and liquidity behind the project
- Fully secured with debtor's assets
- Recourse against debtor's principals
- No venture capital risks
- No start-up projects for parties without fisheries experience

Information Contacts: Local Office: National Marine Fisheries Service, One Blackburn Drive, Gloucester, MA 01930 ,Phone: (978) 281-9202.
Website: http://www.nmfs.noaa.gov/aquaculture.htm

FISHERIES FINANCE PROGRAM

FEDERAL AGENCY: National Oceanic & Atmospheric Administration, US Dept. Of Commerce

Objectives: This program is available for financing and refinancing the construction, reconstruction, reconditioning or purchase costs of:
1) Aquacultural facilities, including land
2) Fisheries shore side facilities, including land
3. Fishing vessels
4. Halibut & Sablefish ITQ's
5. Fishing Capacity Reduction Buybacks

How Does It Work:
- Direct long –term loans from the US Government for fisheries capital projects
- Fixed principal and interest payments to stabilize debt service
- Loans up to 80% of the cost of eligible projects
- Maturities up to 25 years
- Interest rate will be fixed at load inception at 2.0% above the US Treasury's borrowing cost for similar maturities.

To Qualify:
- Must be a US Citizen
- Must have good earnings record, net worth and liquidity behind project
- No venture capital risks
- No startup projects for parties without successful fisheries experience
- Must have good credit
- Must be fully secured with debtor's assets
- Recourse against debtor's principals

For More Information Contact: Northeast Region Financial Services Branch in Gloucester, MA at (978)-281-9202. Website: http://www.nmfs.noaa.gov/ocs/financial_services/index.htm

FOOD EXPORT USA NORTHEAST

Food Export USA Northeast is a private, not-for-profit international trade development organization, which, as a participant in the Market Access Program assists companies in the 10 northeastern states in promoting high-value U.S. food and agricultural products in foreign markets.

Through the Branded Market Access Program (M.A.P.), or Branded Promotion Program, Food Export USA (Northeast) will reimburse 50% of eligible international promotional costs. This program is a cost-share funding program and provides assistance to U.S. companies who are interested in promoting their U.S. products in foreign markets.

The eligible participants are the processors, packers, manufacturers, distributors, wholesalers, export trading companies, or co-ops and who have an office, production facility, or product originating from the Northeast region.

Contact name: Suzanne G. Milshaw, Branded Program Coordinator
Phone: (215) 829-9111
Fax: (215) 829-9777
E-mail: smilshaw@foodexportusa.org
Website : http://www.foodexportusa.org

DEPARTMENT OF COMMERCE -SBIR

SBIR of the Federal Department of Commerce supports creative advanced research in important scientific and engineering areas and is designed to encourage the conversion of government-funded R&D into technological innovation and commercial application. SBIR research can lead to important new technology, major breakthroughs, innovative new products, and next-generation products or processes. The program funds the gap from a research-based idea to a prototype that many industrial and venture capital companies find difficult to support.

Contact name: Dr. Joseph M. Bishop, DOC SBIR Program Manager
1315 East West Highway
Silver Spring, MD 20910
Telephone (301) 713-3565
Fax (301) 713-4100
E-mail: joseph.bishop@noaa.gov
Website: http://ts.nist.gov/

NATIONAL SCIENCE FOUNDATION -SBIR

The National Science Foundation (NSF) is an independent Federal agency, the aim of which is to promote and advance scientific and engineering progress in the United States. The SBIR National Science Foundation encourages the submission of research proposals to discover the new knowledge that is needed to enable the design and production of new generation vehicles. Such proposals should be sent to the most appropriate disciplinary program of the Foundation

for merit review. Approximately 25 percent of Federal research support to academic institutions for basic research is provided by the NSF.

Contact name: Dr. Bruce M. Kramer, National Science Foundation
ENG/DMII - Room 550
4201 Wilson Boulevard
Arlington, VA 22230
Phone: (703) 306-1330
Website: http://www.nsf.gov
E-mail: bkramer@nsf.gov
Fax: (703) 306-0298

FISHERIES FINANCE PROGRAM AT THE NATIONAL MARINE FISHERIES SERVICE (NMFS)

The National Marine Fisheries Service (NMFS) or "NOAA Fisheries" is a part of the **National Oceanic and Atmospheric Administration (NOAA).** NMFS administers NOAA's programs which support the domestic and international conservation and management of living marine resources. NMFS provides services and products to support domestic and international fisheries management operations, fisheries development, trade and industry assistance activities, enforcement, protected species and habitat conservation operations, and the scientific and technical aspects of NOAA's marine fisheries program.

The Fisheries Finance Program of the National Marine Fisheries Service, provides low-cost, long-term credit to the U. S. aquaculture and fishing industries. Financing and refinancing is available for the construction, reconstruction, reconditioning or purchase costs of aquacultural facilities (including land).

Northeast Region Financial Services Branch
One Blackburn Drive
Gloucester, MA 01930
(301) 713-2396
Website: http://www.nero.nmfs.gov/ro/doc/finance.htm

SALTONSTALL KENNEDY GRANT PROGRAM AT THE NATIONAL MARINE FISHERIES SERVICE (NMFS)

The S-K Grant Program is a competitive program administered by the National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration, Department of Commerce. The program provides financial assistance (grants or cooperative agreements) for research and development projects to strengthen and develop the U.S. fishing industry and offshore aquaculture. Projects that primarily involve business start-up or infrastructure development are not eligible for funding under the S-K Program.

Contact name: Alicia Jarboe, S-K Program Manager
Office of Sustainable Fisheries, F/SF2
National Marine Fisheries Service, NOAA
1315 East West Highway
Silver Spring, Maryland 20910
Phone: (301-713-2358)
Website: http://www.nmfs.noaa.gov/ocs/skhome.html

Attachment A: Soil Conservation Districts

DISTRICT	Telephone Number
Bergen	201-261-4407 or 201-538-1552
Burlington	609-267-7410 or 609-267-0811
Camden	609-767-1676 or 609-267-0811
Cape-Atlantic	609-625-3144 or 609-625-9400
Cumberland	609-451-2422 or 609-451-2144
Freehold (Monmouth and Middlesex)	732-446-2300 or 732-462-1079
Gloucester	609-589-5250 or 609-582-9027
Hudson, Essex, & Passaic	973-364-0786 or 973-538-1552
Hunterdon	908-788-1397 or 908-782-3915
Mercer	609-586-9603 or 609-584-8337
Morris	973-285-2953 or 973-538-1552
Ocean	609-971-7002 or 609-267-0811
Salem	609-769-1124 or 609-582-9027
Somerset-Union	908-526-2701 or 908-725-3848
Sussex	973-579-5074 or 973-852-5450
Warren	908-852-2579 or 908-852-5450
State Soil Conservation Committee NJ Department of Agriculture PO Box 330 Trenton, NJ 08625	609-292-5540

Attachment B: CAFRA

CAFRA Permits

The CAFRA Zone is an area along New Jersey's shoreline that was designated to address the concerns of saving open space while allowing development to occur in an orderly fashion.

Municipalities within the Coastal Area:

ATLANTIC COUNTY		
Absecon City	Estell Manor Township	Mullica Township
Atlantic City	Galloway Township	Northwood City
Brigantine City	Hamilton Township	Pleasantville City
Corbin City	Linwood City	Port Republic City
Egg Harbor City	Longport Borough	Somers Point City
Egg Harbor Township	Margate City	Ventnor City
		Weymouth Township
BURLINGTON COUNTY		
Bass River Township		
Washington Township		
CAPE MAY COUNTY		
Avalon Borough	North Wildwood City	West Wildwood Borough
Cape May City	Ocean City	Wildwood City
Cape May Point Borough	Sea Isle City	West Wildwood Crest Borough
Dennis Township	Stone Harbor Borough	Woodbine Borough
Lower Township	Upper Township	
Middle Township	West Cape May Borough	
CUMBERLAND COUNTY		
Bridgeton City	Greenwich Township	Maurice River Township
Commercial Township	Hopewell Township	Millville City
Downe Township	Lawrenceville Township	Stow Creek Township
Fairfield Township		
MIDDLESEX COUNTY		
Old Bridge Township (Madison)		

MONMOUTH COUNTY		
Aberdeen Township (Matawan)	Highlands Borough	Oceanport Borough
Aberdeen Borough (Matawan)	Holmdel Township	Red Bank City
Allenhurst City	Interlaken Borough	Rumson Borough
Asbury Park City	Keansburg Borough	Sea Bright Borough
Atlantic Highlands Borough	Keyport Borough	Sea Girt Borough
Avon-by-the-Sea Borough	Little Silver Borough	Shrewsbury Borough
Belmar Borough	Loch Arbour Village	South Belmar Borough
Bradley Beach Borough	Long Branch City	Spring Lake Borough
Brielle Borough	Manasquan Borough	Union Beach Borough
Deal Borough	Middletown Township	Wall Township
Eatontown Borough	Monmouth Beach Borough	West Long Branch Borough
Fair Haven Borough	Neptune City	
Hazier Township	Ocean Township	
OCEAN COUNTY		
Barnegat Light Borough	Dover Township	Pine Beach Township
Barnegat Township (Union)	Lakehurst Borough	Point Pleasant Beach Township
Bay Head Borough	Lakewood Township	Seaside Heights Borough
Beach Haven Borough	Lavalette Township	Seaside Park Borough
Beachwood Borough	Little Egg Harbor Township	Ship Bottom Borough
Berkeley Township	Long Beach Township	South Toms River Borough
Brick Township	Manchester Township	Stafford Township
SALEM COUNTY		
Elsinboro Township	Pennington Township	Quinton Township
Lower Alloways Creek Township	Pennsville Township	Salem City
		Upper Penns Neck

Attachment C: Pineland Area Jurisdiction Boundaries

Municipalities within the Pinelands Area

ATLANTIC COUNTY		
Brigantine	Egg Harbor Township	*Hammonton
Buena Borough	Estell Manor Township	*Mullica Township
Buena Vista Township	*Folsom Township	Port Republic City
Corbin City	Galloway Township	Somers Point
*Egg Harbor City	Hamilton Township	Weymouth Township
BURLINGTON COUNTY		
Bass River Township	North Hanover Township	*Tabernacle Township
Evesham Township	Pemberton Township	*Washington Township
*Medford Lakes Borough	*Shamong Township	*Woodland Township
Medford Township	Southampton Township	Wrightsown Borough
New Hanover Township	Springfield Township	
CAMDEN COUNTY		
Berlin Borough	*Chesilhurst Borough	Winslow Township
Berlin Township	*Waterford Township	
CAPE MAY COUNTY		
Dennis Township	Upper Township	Woodbine Township
Middle Township		
CUMBERLAND COUNTY		
Maurice River Township	Vineland City	
OCEAN COUNTY		
Barnegat Township	Jackson Township	Ocean Township
Beachwood Borough	Lacey Township	Plumstead Township
Berkley Township	Lakehurst Borough	South Toms River
Dover Township	Little Egg Harbor Township	Stafford Township
Eagleswood Township	Manchester Township	Tuckerton Borough
GLOUCESTER COUNTY		
Franklin Township	Monroe Township	

*- Municipalities located entirely within the State Pinelands Area

Attachment D: The Hackensack/Meadowlands Drainage Review Area

Municipalities within the Hackensack/Meadowlands Drainage Review Area

HUDSON COUNTY		
Carney City	North Bergen	Secaucus
Jersey City		
BERGEN COUNTY		
Carlstadt	Moonachie	Rutherford
East Rutherford	North Arlington	South Hackensack
Linhurst	Richfield	Teterboro
Little Ferry		

Attachment E: D&R Drainage Review Areas

Municipalities within the Delaware and Raritan Canal Area

HUNTERDON COUNTY		
Delaware Township	Kingwood Township	Stockton
East Amwell Township	Lambertville	West Amwell Township
Franklin Township	Raritan Township	
MERCER COUNTY		
East Windsor Township	Hopewell Township	Princeton Township
Ewing Township	Lawrence Township	Trenton
Hamilton Township	Pennington	Washington Township
Hightstown	Princeton Borough	West Windsor Township
Hopewell Borough		
MIDDLESEX COUNTY		
Cranbury Township	New Brunswick	Plainsboro Township
Monroe Township	North Brunswick Township	South Brunswick Township
MONMOUTH COUNTY		
Millstone Township		
SOMERSET COUNTY		
Franklin Township	Millstone	Rocky Hill
Hillsborough	Montgomery Township	South Bound Brook
Manville		

Attachment F: Publicly Owned Treatment Works

Delegated Local Treatment Works Facilities in New Jersey

Bayshore Regional Sewerage Authority Chris Livesey, IPP Coordinator 908-739-1095	Township of North Bergen Municipal Utilities Authority, Robert C. Fischer, Superintendent 201-295-0010
Bergen County Utilities Authority Eric Anderson, Principal Engineer 201-641-2552	Northwest Bergen County Utilities Authority Daniel Bigler, Contract IPP Coordinator 201-447-2660
Camden County Municipal Utilities Authority Robert Clark, Regulatory Compliance 609-541-5200	Ocean County Utilities Authority Chris Haines, IPP Coordinator 908-269-4500
Ewing-Lawrence Sewerage Authority Bill Carmichael, IPP Coordinator 609-587-4061	Passaic Valley Sewerage Commissioners Frank D'Ascensio, Ind. Waste&Pollution Control 201-817-5710 Andrew Caltigorone 201-817-5723
Gloucester County Utilities Authority Joe Boring, IPP Case Manager 609-423-3500	Rahway Valley Sewerage Authority John Ludington, IPP Coordinator 908-388-4749
Township of Hamilton Scott Gibson, IPP Coordinator 609-581-4140	Rockaway Valley Regional Sewerage Authority. Jennifer Pien, IPP Coordinator 201-263-1555
Hanover Sewerage Authority Christine Morganti, IPP Coordinator 201-428-2500	Somerset-Raritan Valley Sewerage Authority Ed Roan, Special Projects Coordinator 908-469-0593
Joint Meeting of Essex & Union Counties Cathy Martinson, IPP Coordinator 908-353-1313	Stony Brook Regional Sewerage Authority Heidi Bode, Regulatory Officer 609-924-8881
Linden-Roselle Sewerage Authority Judy Spadone, Monitoring Manager 908-474-8645	City of Trenton Sewerage Authority Peter Lupinacci, Environmental Programs 609-989-3097
Middlesex County Utilities Authority Kevin Aiello, Environmental Quality Michael Lopez- 908-721-3800	Two Bridges Sewerage Authority Robyn C. Nellessen, Lab Manager 201-696-4494
Township of Morris Fred Rossi, Township Engineer 201-326-7400	Township of Wayne Charles Moeller, Superintendent of Lines 201-694-1800
Mount Holly Sewerage Authority David Reich, IPP Coordinator 609-267-1110	West New York Municipal Utilities Authority Mike Weng, IPP Coordinator 201-861-7000

Attachment G: USGS Map Dealers in New Jersey

EFINGER SPORTING GOODS CO 513 W UNION AVE **BOUND BROOK**, NJ 08805 (732) 356-0604	EASTERN MOUNTAIN SPORTS INC BRIDGEWATER COMMONS 400 COMMONS WAY STE 360 **BRIDGEWATER**, NJ 08807 (908) 725-7255	FLYING HIGH INC 12 EAST MAIN ST **CLINTON**, NJ 08809 (908) 735-2411
DOVER SPORTS CENTER 242 ROUTE 46 **DOVER**, NJ 07801 (973) 366-3133	ZEUS PRODUCTS CO INC 6679 BLACK HORSE PIKE **EGG HARBOR TWP**, NJ 08234 (609) 646-1668	GATEWAY NATIONAL RECREATION AREA SANDY HOOK UNIT BLDG 26 P O BOX 530 **FORT HANCOCK**, NJ 07732 (908) 872-0115
EASTERN MOUNTAIN SPORTS INC FREEHOLD RACEWAY MALL 3710 RTE 9 SPACE D124 **FREEHOLD**, NJ 07728 (732) 409-2424	THE MAP STORE 456 ROUTE 31 & ANDERSON RD PO BOX 366 **HAMPTON**, NJ 08827 (908) 537-4081	HIGHLAND GENERAL STORE INC 111 HIGHLAND LAKES RD PO BOX 92 **HIGHLAND LAKES**, NJ 07422 (973) 764-4541
BLUE RIDGE MOUNTAIN SPORTS 23 MAIN ST **MADISON**, NJ 07940 (201) 377-3301	ALL SEASONS MARINA 551 ROOSEVELT BLVD **MARMORA**, NJ 08223 (609) 390-1850	CAPE-ATLANTIC SOIL CONSERVATION DISTRICT 6260 OLD HARDING HIGHWAY **MAYS LANDING**, NJ 08330 (609) 625-3144
WIND CHIMES BOOKS 210 N HIGH ST **MILLVILLE**, NJ 08332 (609) 327-3714	MCCARTHY'S GEOGRAPHICS 404 BLOOMFIELD AVE **MONTCLAIR**, NJ 07042 (973) 744-7873	THE BOOKSHOP 83 SOUTH STREET **MORRISTOWN**, NJ 07960 (973) 539-2165
RAMSEY OUTDOOR STORES 226 ROUTE 17 **PARAMUS**, NJ 07652 (201) 261-5000	BLUE RIDGE MOUNTAIN SPORTS PRINCETON SHOPPING CENTER 301 N HARRISON ST **PRINCETON**, NJ 08540 (609) 921-6078	INTERNATIONAL MAP COMPANY 547 SHALER BLVD **RIDGEFIELD**, NJ 07657 (201) 943-5550
HARRYS ARMY NAVY STORE 691 ROUTE 130 **ROBBINSVILLE**, NJ 08691 (609) 585-5450	DELAWARE WATER GAP NATIONAL RECREATION AREA 3 MAIN ST **WALPACK CENTER**, NJ 07881 (973) 948-0495	EASTERN MOUNTAIN SPORTS INC WOODBRIDGE CENTER 277 WOODBRIDGE CENTER DR **WOODBRIDGE**, NJ 07095 (732) 634-8787

Attachment H: Important Telephone Numbers in New Jersey

Agency	Referral Section	Telephone #
NJDA	IV-b	609-292-5801
NJDEP Fish &Wildlife	XIV-c	609-292-1599
NJDEP Marine Fisheries	XIV-c	609-748-2020
USFWS, Division of Endangered Species	XIV-d	U.S. Fish and Wildlife Service New Jersey Ecological Services Field Office 927 North Main St., Bldg D-1 Pleasantville, NJ 08232-1454 NJ Natural Heritage Program Office of Natural Lands Mgmt Div. of Parks & Forestry Dept. of Environmental Protection. PO Box 404 Trenton, NJ 08625-0404 609-984-0097
ACOE- Survey Section	XVI-e	212-264-0180
ACOE- Tech Support	XVI-e	212-264-0164
ACOE- Philadelphia office	XVI-e	215-656-6731
Website	USGS Map	http://www.terraserver.com This site allows you to download and printout aerial photographs of your site location.
Website	USGS Map	http://mapping.usgs.gov From that site, you can input the town name (or landmark) and the site will identify. You can then call the USGS at 1-888-ASK-USGS and purchase the correct map.
SADC	Right To Farm	609-984-2504 agsduda@ag.state.nj.us
USDA- NRCS	Land Resources	732-246-1171
NJDA	Crop Insurance	609-292-5801
USDA/APHIS	USAD/APHIS	202-720-5193 (Dr.Otis Miller)
The Pinelands Commission	New Jersey Pinelands Commission	PO Box 7 New Lisbon, NJ 08064 609-894-7300
NJ Department of Health and Senior Services	NJ Department of Health and Senior Services	PO Box 360 Trenton, NJ 08625 609-292-7837
NJDA	Farmland Assessment	NJDA PO Box 330 Trenton, NJ 08625 609-984-2503
New Jersey Division of Taxation	Farmland Assessment	609-292-7974

Attachment I: Farm Service Agency (FSA) Contacts

COUNTY	ADDRESS	PHONE	FAX
Burlington, Camden, Ocean	Tiffany Square, Suite 200 RD 2, Route 38 Mount Holly, NJ 08060	609-267-1639	609-261-3007
Cumberland, Atlantic, Cape May	1317 South Main Rd. Bldg. 3, Suite A Vineland, NJ 08360	865-205-1225	856-205-0691
Hunterdon, Somerset	4 Gauntt Place Extension Building Flemington, NJ 08822	908-782-4614	908-782-0501
Monmouth, Middlesex, Mercer	303 West Main St. Freehold, NJ 07728	732-462-0075	732-432-5274
Warren, Morris, Sussex	Hackettstown Commerce Park 101 Bilby Road Building 1-H Hackettstown, NJ 07840	908-852-2576	908-852-4666
Salem, Gloucester	51 Cheney Rd, Suite 3 Woodstown, NJ 08098	609-769-1126	609-769-0718

Attachment J: Fish & Shellfish Diagnostic Centers

For Fish:	For Shellfish:
Hackettstown State Fish Hatchery PO Box 327 Hackettstown, NJ 07840 908-852-4950 Dr. Ed Washuta	Haskin Shellfish Research Lab Rutgers University 6959 Miller Ave. Port Norris, NJ 08349 856-785-0074, ext. 105

Attachment K: State & County Economic Contacts

State Programs

New Jersey Commerce & Economic Growth Commission
Division of International Trade
20 W. State St.
PO Box 823
Trenton, NJ 08625
609-633-3606
609-777-0885

Federal Programs

U.S. Small Business Development Administration.
2 Gateway Center
15th Floor
Newark, NJ 07102

973-645-2434

U.S. Dept. of Agriculture
NJ Farm Service Agency
163 Route 130
Bldg.#2, Suite E
Bordentown, NJ 08505-2249
609-298-3446

State Funding

New Jersey Commerce & Economic Growth Commission
Urban Enterprise Zone Authority
20 W. State St., PO Box 829
Trenton, NJ 08625
609-984-6775

New Jersey Economic Development Authority
36 W. State St.
PO Box 990
Trenton, NJ 08625-0990

Division of Investment Banking: 609-292-0192

Division of Commercial Lending: 609-292-0187

County Funding Resources

Atlantic County Dept. of Regional Planning & Development
US Rt.9 & Dolphin Ave.
PO Box 719
Northfield, NJ 08225-0719
Contact name: Bob Lindaw
609-645-5898
(f) 609-645-5964

Cumberland County Department of Planning and Development
800 E. Commerce St.
Bridgeton, NJ 08302
Contact name: Steven Kehs
609-453-2177

Ocean County Economic and Development Department
129 Hooper Ave.
Toms River, NJ 08754
PO Box 2191
Contact name: David McKeon
732-929-2054

Salem County Department of Economic Development
98 Market St.
Salem, NJ 08079
Contact name: Pat Knobloch
609-339-8615

Other Funding Resources

First Pioneer Farm Credit
9 County Road 618
Lebanon, NJ 08833-3028
800-787-3276
908-782-5215
(f) 908-782-5229
Contact name: Deanne Merring

Casino Reinvestment Development Authority
1014 Atlantic Ave.
Atlantic City, NJ 08401
609-347-0500
Contact name: Pat Chandler

South Jersey Economic Development District
18 N. East Ave.
Vineland, NJ 08360
609-794-8497
Contact name: Gordon Dahl

Jersey Fresh Matching Grant Program
NJ Dept. of Agriculture
PO Box 330
Trenton, NJ 08625
609-292-5567
Contact name: Al Murray

Small Business Assistance Programs

New Jersey Commerce and Economic Growth Commission
20 West State St.
PO Box 835
Trenton, NJ 08625
Office Of Small Business Assistance: 609-292-3860
Office Of Women Business Enterprise: 609-292-3860
Office Of Minority Business Enterprise: 609-292-3860
Bureau of Community Affairs: 609-984-3223

ATTACHMENT L: Threatened and Endangered Species in New Jersey

Endangered species are those whose prospects for survival in New Jersey are in immediate danger because of loss of or change in habitat, over-exploitation, predation, competition, disease, disturbance, or contamination. Assistance is needed to prevent future extinction in New Jersey.

Threatened species are those who may become endangered if conditions surrounding them begin or continue to deteriorate.

BIRDS			
Endangered		**Threatened**	
Common	Scientific	Common	Scientific
Bittern, American	*Botaurus lentiginosos**	Bobolink	*Dolichonyx oryzivorus*
Eagle, bald	*Haliaeetus leucocephalis***	Hawk, red-shouldered (breeding)	*Buteo lineatus*
Falcon, peregrine	*Falco peregrinus***	Hawk, red-shouldered (non-breeding)	*Buteo lineatus*
Goshawk, northern	*Accipiter gentilis*	Heron, Black-crowned night	*Nycticorax nycticorax*
Grebe, pied-billed	*Podilymbus podiceps**	Knot, red	*Calidris canutus*
Harrier, northern	*Circus cyaneus**	Osprey	*Pandion haliaetus*
Hawk, Cooper's	*Accipiter cooperii*	Owl, barred	*Strix varia*
Night-heron, yellow-crowned	*Nyctanassa violaceus*	Owl, long-eared	*Asio otus*
Owl, short-eared	*Asio flammeus**	Rail, black	*Laterallus jamaicensis*
Plover, piping	*Charadrius melodus***	Sparrow, grasshopper	*Ammodramus savannarum*
Sandpiper, upland	*Batramia longicauda*	Sparrow, Savannah	*Passerculus sandwichensis*
Shrike, loggerhead	*Lanius ludovicianus*	Woodpecker, red-headed	*Melanerpes erythrocephalus*
Skimmer, black	*Rynchops niger*		
Sparrow, Henslow's	*Ammodramus henslowii*	*Only breeding population considered endangered or threatened **Federally endangered or threatened	
Sparrow, vesper	*Pooecetes gramineus*		
Tern, least	*Sterna antillarum*		
Tern, roseate	*Sterna dougallii*		
Wren, sedge	*Cistothorus platensis*		

REPTILES			
Endangered		**Threatened**	
Common	Scientific	Common	Scientific
Rattlesnake, timber	*Crotalus horridus*	Turtle, wood	*Clemmys insculpta*
Snake, corn	*Elaphe guttata*	Atlantic Green Turtle	*Chelonia mydas***
Turtle, bog	*Clemmys muhlenbergii***	Snake, northern pine	*Pituophis melanoleucus*
Atlantic Hawksbill	*Eretmochelys imbricata***	**Federally endangered or threatened	
Atlantic Loggerhead	*Caretta caretta***		
Atlantic Ridley	*Lepidochelys kempi***		
Atlantic Leatherback	*Dermochelys coriacea***		

AMPHIBIANS			
Endangered		**Threatened**	
Common	Scientific	Common	Scientific
Salamander, Tremblay's	*Ambystoma tremblayi*	Salamander, eastern mud	*Pseudotriton montanus*
Salamander, blue-spotted	*Ambystoma laterale*	Salamander, longtail	*Eurycea longicauda*
Salamander, eastern tiger	*Ambystoma tigrinum*		
Treefrog, pine barrens	*Hyla andersonii*		
Treefrog, southern gray	*Hyla chrysocelis*		

MAMMALS		INVERTEBRATES	
Endangered		**Endangered**	
Common	Scientific	Common	Scientific
Bobcat	*Lynx rufus*	Mitchell's Satyr (butterfly)	*Neonympha m. mitchellii***
Woodrat, Eastern	*Neotoma floridana*	Northeastern Beach Tiger Beetle	*Cincindela d. dorsalis*
Whale, sperm	*Physeter macrocephalus***	American Burying Beetle	*Nicrophorus americanus***
Whale, fin	*Balaenoptera physalus***	Dwarf Wedge Mussel	*Alasmidonta heterodon***
Whale, sei	*Balaenoptera borealis***		
Whale, blue	*Balaenoptera musculus***		
Whale, humpback	*Megaptera novaeangliae***		
Whale, black LEFT	*Balaena glacialis***		
**Federally Endangered			

FISH	
Endangered	
Common	Scientific
Sturgeon, shortnose	*Acipenser brevirostrum*

Website: http://www.state.nj.us/dep/fgw/tandespp.htm

Attachment M: AQUACULTURE WEBSITES

Site	address
Agrisurf.com	http://www.agrisurf.com
American Fisheries Society	http://www.fisheries.org/
Aquaculture Health Page	http://geocities.com/capecanaveral/lab/7490/
Aquaculture Magazine Online	http://www.aquaculturemag.com/
Aquaculture Network Information Center (aquaNIC)	http://aquanic.org
Aquaculture Outlook (LDP-AQS) U.S.D.A. reports on the U.S. aquaculture industry	http://usda.mannlib.cornell.edu/reports/erssor/livestock/ldp-aqs/
Aquaculture Technology Program, Cumberland County College	http://maclab.cccnj.net/aqua/index.htm
AquaFarm.com - listing of software products for aquaculture design, management, and analysis	http://www.aquafarm.com/
Aquaponics.com - information on aquaculture and hydroponics	http://www.aquaponics.com/
Aquatext - Free Online Aquaculture Dictionary	http://www.aquatext.com/dicframe.htm
Aquatic Network (AquaNET)	http://www.aquanet.com
FishBase - information on practically all fish species known to science	http://www.fishbase.org/search.html
Fisheries Technical Terms - Fisheries glossary from Northeast Fisheries Science Center (NOAA)	http://www.wh.whoi.edu/techniques/tech_terms.html
Food and Agriculture Organization	whttp://www.fao.org/fi/default_all.asp
Food Marketing Institute	http://www.fmi.org
Global Aquaculture Alliance - dedicated to advancing environmentally responsible aquaculture	http://www.gaalliance.org/
Harbor Branch Oceanographic Institution	http://www.aquaculture-online.org/
International Aquaculture WebRing	http://www.aquaculture-com.net/aquaculture/webring/
Interstate Shellfish Sanitation Conference (ISSC)	http://www.issc.org
National Marine Fisheries Service	http://www.noaa.gov/fisheries.html
Resaturant.com	http://www.restaurant.com
Sci-TechResources.gov - Government science and technology websites produced by the National Technical Information Service of the Department of Commerce.	http://www.scitechresources.gov/
United States Department of Agriculture	http://www.usda.gov
World Aquaculture Society (WAS)	http://www.was.org
World Health Organization	http://www.who.org